UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF NEW YORK

- X

UNITED STATES OF AMERICA,

Plaintiff,

- against -

Civil Action
No. CV- 07-0835

(Seybert, J.)
(Orenstein, Ch. M. J.)

AGI-VR/WESSON COMPANY;
ALLOY CARBIDE COMPANY;
CHI MEI CORPORATION;
CLIMAX MOLYBDENUM COMPANY;
CLIMAX MOLYBDENUM MARKETING CORPORATION;
COUNTY OF NASSAU, NEW YORK;
CYPRUS AMAX MINERALS COMPANY;
GENERAL ELECTRIC COMPANY;
GTE CORPORATION;
H.C. STARCK, INC.;
KENNAMETAL INC.;
M & R INDUSTRIES, INC.;
MINMETALS INC.;
OSRAM SYLVANIA CORPORATION;
PHILIPS ELECTRONICS NORTH AMERICA CORPORATION;
SANDVIK AB;
TDY HOLDINGS, LLC; and
TDY INDUSTRIES, INC.,

Defendants.

- X

APPENDIX A TO THE CONSENT JUDGMENT

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Li Tungsten Corporation Superfund Site

City of Glen Cove

Nassau County, New York

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Li Tungsten Corporation Site, which was chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan. This decision document explains the factual and legal basis for selecting the remedy for this Site.

The New York State Department of Environmental Conservation (NYSDEC) concurs with the selected remedy. A letter of concurrence from the NYSDEC is attached to this document (**Appendix IV**).

The information supporting this remedial action decision is contained in the administrative record for this Site. The index for the administrative record is attached to this document (**Appendix III**).

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from the Li Tungsten Corporation Site, if not addressed by implementing the response actions selected in this Record of Decision, may present an imminent and substantial endangerment to the public health or welfare, or to the environment.

DESCRIPTION OF THE SELECTED REMEDY

The remedial action described in this document addresses contaminated soil and groundwater at the Li Tungsten Corporation Site. The Site includes both the Li Tungsten facility (designated operable unit 1) as well as those portions of the Captain's Cove property (designated operable unit 2) on which radioactive ore residuals were deposited.

Selected Soil Remedy

The major components of the selected soil remedy include:

- Excavation of soils and sediments contaminated above cleanup levels;
- Separation of radionuclide-contaminated soil from non-radionuclide soil contaminated with heavy metals;
- Off-Site disposal of both radionuclide and metals-contaminated soil at appropriately licensed facilities;
- Off-Site disposal of radioactive waste located in the Dickson Warehouse at an appropriately licensed facility;
- Building demolition at the Li Tungsten facility;
- Storm sewer and sump cleanouts at the Li Tungsten facility;
- Institutional controls governing the future use of the Site;
- Decommissioning of Industrial Well N1917 on Parcel A; and
- Collection and off-site disposal of contaminated surface water from Parcels B and C.

In the event that separation of radionuclide-contaminated soil from nonradionuclide soil contaminated with heavy metals cannot be accomplished in a cost-effective manner, the excavated soils will be disposed at appropriately licensed facilities as described in Alternatives LS-2 and CS-2 in the Decision Summary of this Record of Decision.

The Remedial Action Objectives for soil are to prevent or minimize exposure to contaminants of concern through inhalation, direct contact or ingestion, and to prevent or minimize cross-media impacts from contaminants of concern in soil/sediments to underlying groundwater.

Selected Groundwater Remedy

The selected groundwater remedy includes no action, other than a long-term groundwater monitoring program, to assess the recovery of the Upper Glacial Aquifer after the soil remedy is implemented.

The Remedial Action Objectives for groundwater are to prevent or minimize ingestion, dermal contact and inhalation of metals-contaminated groundwater on lower Parcel C and on Parcel A that is above State and Federal MCLs, as well as to restore groundwater quality to levels which meet State and Federal standards. The metals-contaminated groundwater in the Upper Glacial Aquifer can be characterized as generally low-level and sporadic in nature. EPA believes that attainment of State and Federal standards for contaminated groundwater will be hastened by the soil cleanup that is part of the selected remedy. EPA also believes that the objectives related to minimizing exposure to contaminated groundwater are presently satisfied, and will remain so in the future use commercial development scenario.

DECLARATION OF STATUTORY DETERMINATIONS

The selected remedy meets the requirements for remedial actions set forth in CERCLA §121, 42 U.S.C. §9621. It is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. The selected remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable, and satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume of contaminants as their principal element.

Because this remedy will result in hazardous substances remaining on the Site above health-based levels, a review will be conducted within five years after commencement of the remedial action, and every five years thereafter, to ensure that the remedy continues to provide adequate protection of human health and the environment.

______________________________ _________________________

Jeanne M. Fox Date
Regional Administrator

RECORD OF DECISION

Li Tungsten Corporation Superfund Site

City of Glen Cove
Nassau County, New York

United States Environmental Protection Agency
Region II
New York, New York
September 1999

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SITE NAME, LOCATION AND DESCRIPTION

The Li Tungsten Corporation Site (Site) consists of two tracts of land - the real property comprising the former Li Tungsten facility (referred to below as the Li Tungsten facility) and portions of the real property comprising the former Captain's Cove condominium development and Garvies Point dump site (referred to below as the Captain's Cove property). The Li Tungsten facility is located at 63 Herbhill Road in the City of Glen Cove, Nassau County, Long Island, New York. The Captain's Cove property is located approximately 0.5 mile to the west of the Li Tungsten facility on Garvies Point Road (see **FIGURE 1**).

The 26-acre Li Tungsten facility (see **FIGURE 2**) consists of four parcels designated by EPA as A, B, C, and C'. Parcel A is a seven-acre paved area abutting Glen Cove Creek which served as the main operations center when the facility was active. Historically, Parcel A contained the majority of the buildings and other structures (mostly aboveground tanks).

Parcel B is a six-acre tract north of Parcel A. Parcel B is undeveloped and contains a small pond, an intermittent stream, and a small wetland. Two separate areas on Parcel B, south of the pond and directly opposite the Benbow Building, were used as parking areas when the Li Tungsten facility was active. The northernmost portion of Parcel B was used as an employee picnic area. The area between the two parking areas was used for disposal of ore and other metals-processing residues. Directly north of Parcel B is residential housing along The Place, an historic street dating from Glen Cove's original settlement in the Seventeenth Century.

Parcel C, approximately ten acres in size, is north of Parcel A and west of Parcel B. The Dickson Warehouse and the Benbow Building, shown on **FIGURE 2**, are located on Parcel C. A 500,000-gallon aboveground fuel oil tank and two other storage tanks were removed from this parcel during an EPA removal action completed in 1998. In addition, three surface impoundments (one lined impoundment called "Mud Pond" and two unlined impoundments called "Mud Holes") were present on Parcel C during facility operations.

Parcel C' is approximately four acres and consists of undeveloped land adjacent to Parcel C. Parcel C' was not part of the facility during active operations; however, some limited disposal activity also took place on a small portion of this parcel. Residential housing on Janet Lane abuts Parcel C' to the north. For the purposes of the remediation of the Site, EPA is addressing Parcel C' as part of Parcel C.

The Captain's Cove property (see **FIGURE 3**) is a 23-acre parcel at the end of Garvies Point Road, approximately 0.5 mile west of the Li Tungsten facility. The property is bounded by Hempstead Harbor to the west, Garvies Point Preserve to the north (across Garvies Point Road), the Glen Cove Anglers' Club to the east, and Glen Cove Creek to the south. A four-acre wetland makes up a portion of the property's southern boundary with the Creek. The portions of the Captain's Cove property which are part of the Li Tungsten Site consist of two general areas where radioactive wastes were deposited. The remainder of the property has been investigated as a State Superfund site by the State of New York.

The Li Tungsten and Captain's Cove properties are located in a mostly commercial area along the north side of Glen Cove Creek. The immediate area includes light and heavy industry, commercial businesses, a sewage treatment plant, a Nassau County public works facility, and five State or Federal hazardous waste sites. The area, which was settled in the Seventeenth Century, has been industrialized since the mid-1800's. However, there are residences within 100 feet of the northern ends of Parcels B and C of the Li Tungsten property, along Janet Lane and The Place, and within 1,000 feet of Captain's Cove on McLoughlin Street. Other area land uses include marinas, yacht clubs, beaches, and the Garvies Point Preserve. The Li Tungsten property is presently zoned industrial, while Captain's Cove is zoned residential.

Also located on the north side of Glen Cove Creek are two other State Superfund sites; namely, Konica Imaging USA, Inc., (formerly the manufacturing facilities known as Powers Chemco and as Columbia Ribbon and Carbon Company), and Crown Dykman Laundry (now operated as a Volvo service facility), as well as one other Federal Superfund site, the Mattiace Petrochemical Site, which adjoins the Li Tungsten facility to the west. EPA's remedial efforts at the Mattiace Site have included a remedial investigation and feasibility study (RI/FS) which addressed Glen Cove Creek as a potential receptor of hazardous waste. Remedial action at the Mattiace Site involved removal and off-site disposal of chemical storage tanks and heavily contaminated soils; extraction and treatment of contaminated soil gases and groundwater at a newly constructed treatment facility; and monitoring of groundwater as well as Glen Cove Creek's sediments and water column for the duration of the estimated 30 years of the treatment facility operation.

A three-mile radius of the Site includes the City of Glen Cove, as well as a large portion of Long Island Sound, Sea Cliff, Brookville, Glen Head, Locust Valley, Sands Point, Port Washington, and Lattingtown. Notable features within this area are Garvies

Point Preserve, a community hospital, and several schools, country clubs, and municipal parks. Approximately 44,000 people are estimated to reside within this three-mile radius.

The City of Glen Cove has begun a revitalization effort involving over 200 acres surrounding Glen Cove Creek. The City's Glen Cove Creek Revitalization Plan was finalized in 1998. The Revitalization Plan projects that future use of the area will be commercial and may include a high-speed ferry to Manhattan and Connecticut, as well as boardwalks, museums, restaurants, shops, a hotel, and a conference center. To help implement the Revitalization Plan, the City is utilizing both State and Federal Brownfields funding to relocate several non-water-dependent businesses presently adjacent to the Creek to other areas of the City.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

History

The processing of tungsten and other metals at the Li Tungsten facility began in 1942 and ended in 1985. The facility's operations consisted mainly of processing tungsten ore concentrates and scrap metal containing tungsten (collectively referred to below as tungsten material) into ammonium paratungstate (APT) and the formulating of APT into tungsten powder and tungsten carbide powder. Other products produced at the facility included tungsten carbide powder for plasma spraying, tungsten titanium carbide powder, tantalum carbide powder, tungsten spray powder, crystalline tungsten powder, and molybdenum spray powder. From 1945 to the early 1950's, the facility processed significant amounts of antimony (tin) ore concentrates into pure antimony.

A variety of extraction processes were used to separate the various accessory metals from the tungsten, depending upon the specific type of tungsten material being processed. Typical operations in the extraction process included physical, chemical, and mechanical processes such as sizing and crushing, gravity separation, magnetic and electrostatic separation, roasting, leaching, flotation, and fusion.

Numerous aboveground wooden, steel, and fiberglass tanks were used at the facility to perform these operations and to store reactants. As certain tungsten material moved through the various processing stages, accessory metals including radioactive isotopes of thorium, uranium, and radium, as well as other heavy metals, became more concentrated in the residue or slag. The other accessory metals which became concentrated in the tungsten material and were removed as impurities during the extraction process included arsenic, barium, bismuth, copper, cobalt, chromium, lead, manganese, mercury, nickel, vanadium, and zinc.

Some radioactive ore residuals from the Li Tungsten facility were disposed of at the Captain’s Cove property. In addition, radioactive ore residuals and other wastes from the processing of the tungsten material were deposited on Parcels B and C. Liquid wastes are believed to have been disposed of through numerous subsurface drainage pipes in the bulkhead which empty directly into Glen Cove Creek. State Pollutant Discharge Elimination System permits for the facility allowed for up to as many as 250,000 gallons per day of discharge to Glen Cove Creek. The two unlined Mud Holes on Parcel C were also reportedly used to dispose of liquid wastes.

On July 21, 1989, EPA signed an Administrative Order on Consent with the current owner of the Li Tungsten facility property, the Glen Cove Development Corporation (GCDC), for the performance of a removal action at the Li Tungsten facility. Activities performed by GCDC included addressing radioactive materials, removing drummed chemicals and laboratory reagents, addressing a mercury spill, and sampling, analyzing, and inventorying work. Work pursuant to the Order was completed in July 1990.

In 1995 and 1996, EPA performed response activities at the Li Tungsten facility in order to facilitate performance of EPA’s RI. The interim measures included the consolidation and temporary relocation of ore materials to the Dickson Warehouse on Parcel C, as well as the removal of significant quantities of debris and vegetation. EPA completed its phased removal activities from October 1996 to October 1998, primarily to address the hazards associated with the remaining Li Tungsten tank wastes. The removal action resulted in the disposal of large volumes of waste liquid and sludge from the 271 process and storage tanks, as well as removal and disposal of asbestos and other hazardous chemicals found at the facility. EPA also demolished two structures on Parcel A, the Dice Complex and East Building, because of the danger posed by their structural instability and in order to facilitate access to tanks.

From the late 1950's to the late 1970's, Captain's Cove was used as a dump site for the disposal of incinerator ash, sewage sludge, rubbish, household debris, dredged sediments from Glen Cove Creek, and industrial wastes. The property was purchased by Village Green Realty at Garvies Point, Inc. in 1983 for a residential condominium development project. Development efforts were abandoned in the mid-1980's when the New York State Department of Environmental Conservation (NYSDEC), after determining that the property was contaminated with radionuclides and other hazardous wastes, designated it as a State Superfund site. The NYSDEC, which is not authorized under State law to address radioactive wastes, requested that EPA address the radioactive contamination at the Captain's Cove property, while the NYSDEC addressed the chemical contamination under its own State program. EPA subsequently determined that the areas of Captain's Cove where radioactive wastes were located could be considered part of the Li Tungsten Site, after sampling showed that the radioactive residuals profile matched that at the Li Tungsten facility. The two primary areas of EPA concern, designated as Area A and Area G, constitute approximately two acres of the entire 23-acre Captain’s Cove property, and the areas are located in the northwestern and eastern corners of the property, respectively.

Meanwhile, EPA developed a workplan for field investigation of the radioactive ore residuals at Captain’s Cove in April 1997 as part of a focused feasibility study (FFS). Prior to this, the NYSDEC at EPA’s request performed a gamma radiation survey of the entire property in 1996, in order to confirm the results obtained during a previous NYSDEC investigation. In March 1997, the NYSDEC entered into an Order with the City of Glen Cove, a former owner of the Captain’s Cove property, to perform an RI/FS for the municipal waste portion of the fill, which is generally segregated from the radioactive ore residuals areas. The fieldwork was performed by the City concurrently with EPA’s FFS fieldwork. The City completed a feasibility study and the NYSDEC issued a Record of Decision (ROD) in March 1999, calling for excavation of all materials and the off-Site disposal of any chemically hazardous waste and any materials greater than one inch in diameter.

<u>Enforcement Activity</u>

As noted above, EPA issued an Administrative Order on Consent to GCDC in 1989 to conduct a removal action at the Li Tungsten facility.

EPA sent Special Notice letters on February 12, 1992 to five potentially responsible parties (PRPs), namely, Teledyne, Inc.; Wah Chang Smelting and Refining Co. of America, Inc.; Li Tungsten, Inc.; Glen Cove Development Corp.; and John C. Li. These letters gave the PRPs 60 days (until April 14, 1992) to submit a good faith proposal to finance or undertake an RI/FS at the Li Tungsten facility. A conditional good faith proposal from Teledyne was received, but subsequent negotiations did not result in a settlement.

EPA then developed an RI/FS workplan and in March 1993 again requested that the PRPs agree to perform the RI/FS and enter into an administrative order on consent with EPA. EPA did not receive any offers to perform the RI/FS . While performing the RI/FS, EPA also continued to develop information as part of its search for additional PRPs, and it has identified and notified an additional 24 parties as PRPS since the original five notifications. EPA continues to investigate the potential Site liability of other parties.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

The RI/FS and FFS reports and the Proposed Plan for the Site were released to the public for comment on July 28, 1999. These documents, as well as other documents in the administrative record (see Administrative Record Index, Appendix III) have been made available to the public at two information repositories maintained at the EPA Docket Room in Region II, New York and the Glen Cove Public Library, located at 4 Glen Cove Avenue, Glen Cove, New York. A public notice announcing the public meeting on the Proposed Plan as well as the availability of the above-referenced documents was published in Newsday on July 28, 1999. The public notice established a thirty-day comment period. EPA subsequently received requests for an extension of the public comment period and extended the comment period through September 17, 1999. The Agency's decision to extend the comment period was announced at the August 16, 1999 public meeting on the Proposed Plan, as well as publicized through mailings to more than 150 interested parties on the Site mailing list.

The public meeting was held at the Glen Cove City Hall, located at 9 Glen Street, Glen Cove, New York, to present the Proposed Plan to interested citizens and to address any questions concerning the Plan and other details related to the RI and FS reports. Responses to the comments and questions received at the public meeting, along with other written comments received during the public comment period, are included in the Responsiveness Summary (see Appendix V).

In the early 1990's, EPA entered into a cooperative agreement for Superfund pilot studies with Clean Sites, Inc. as a result of Clean Sites' January 1989 Report entitled "Making Superfund Work." EPA selected the remediation of the Li Tungsten site as a "pilot" for the application of some of its Superfund improvement concepts, most notably early stakeholder involvement and early identification of most realistic future use of a site. Clean Sites conducted interviews of State/local government officials, local organizations, potentially responsible parties, and interested members of the community, and developed a citizen's advisory group called the Li Tungsten Task Force, complete with a Charter of Rules and Procedures, in March 1994. Although Clean Sites' cooperative agreement expired in July 1996, the Task Force has continued to conduct monthly meetings with EPA without Clean Sites' involvement, usually on the first Thursday of each month. The Task Force also applied for and received a technical assistance grant (TAG) from EPA in September 1995.

SCOPE AND ROLE OF RESPONSE ACTION

Site remediation activities are sometimes segregated into different phases, or operable units, so that remediation of different environmental media or areas of a site can proceed separately, resulting in an expeditious remediation of the entire site. EPA has designated two operable units for the Li Tungsten Site as follows:

Operable Unit 1 (OU 1) - the Li Tungsten Facility
Operable Unit 2 (OU 2) - the Captain's Cove Property

The primary objective of the remedy selected in this ROD is to reduce contaminant levels in affected media, including soils, groundwater, and ponded water/sediments, to levels that are protective of human health and the environment.

The selected remedy will complement cleanup actions previously conducted under the removal program (described above) which have addressed the removal of radioactive materials, drummed chemicals, laboratory reagents, elemental mercury, asbestos, and disposal of large volumes of waste liquid and sludge from 271 process and storage tanks. EPA has also demolished two structures on Parcel A, the Dice Complex and East Building, because of the danger posed by their structural instability and in order to facilitate access for tank removal activity.

SUMMARY OF SITE CHARACTERISTICS

The purpose of the RI for the Li Tungsten facility and the FFS for the Captain's Cove property was to define the nature and extent of any contamination resulting from previous activities at the Site. The RI and FFS were performed by Malcolm Pirnie, Inc. for EPA between March 1993 and November 1998, and included sampling and analysis of surface and subsurface soils, ponded water, and wetlands sediments, storm sewers, and groundwater. The RI Report was issued in May 1998, while the FFS Report was issued concurrently with the FS report in July 1999.

Field work at the Site included the following activities:

- soil gas survey
- gamma radiation survey
- surface soil/ore residuals sampling

- soil borings for purposes of both sampling and gamma logging
- test pitting/sampling
- groundwater monitoring well installation/sampling
- groundwater elevation and aquifer characteristics measurements
- storm sewer/sediment sampling

See **FIGURE 3** for the locations of the above field work activities at the Li Tungsten facility.

To determine which media (soil, groundwater, air, etc.) contain contamination at levels of concern, the analytical data from the fieldwork was compared to applicable or relevant and appropriate requirements (ARARs), or other relevant guidance if no ARARs were available.

There are many contaminants left behind as a result of prior Site activity that may pose a risk to human health and/or the environment. The primary contaminant categories of concern at the Site are radionuclides and heavy metals.

Based upon the results of the RI, certain areas and media of the Site require remediation. These are summarized below. More complete information can be found in the RI and FFS Reports.

Physical Site Conditions

The four parcels of land that made up the Li Tungsten facility have been unused since the facility closed in 1985. Two of the buildings on Parcel A - the Dice Complex and the East Building - were razed and their demolition debris disposed off-Site in 1998 by EPA during the removal action. The Dice Complex alone occupied an area of approximately 100,000 square feet. The property remains fenced (except for Parcel C', which was purchased in the latter stages of Li Tungsten's history and never used during facility operations) and placarded with warnings regarding the hazardous nature of the Site. EPA has removed all equipment and debris from the remaining buildings on Parcel A, i.e., the Carbide Building, Lab/Wire Building, and Loung Building. The structural stability of these buildings is considered borderline. A few areas within the Carbide Building and Lab/Wire Building are contaminated with radioactivity.

The middle of Parcel B and the northern end of Parcel C were used as dumping areas for spent ore and other metals-processing residues. Consequently, some of the highest concentrations of the heavy metals and radionuclides of concern were recorded there.

Of the two remaining buildings on Parcel C, the Dickson Warehouse is relatively structurally sound and is presently being used by EPA to temporarily stockpile approximately 5,000 cubic yards of radioactive ore/slag residuals. The Benbow Building still contains a bank of hydrogen reduction furnaces, which represents the only significant plant equipment still on-Site.

The Captain's Cove property, large parts of which were wetlands prior to being filled in the 1960's and 70's, still has the rubble from two demolished four-story condominium buildings remaining on the eastern end of the property. While these buildings were being erected in the early 1980's by Village Green Realty, the NYSDEC determined that the property should be investigated for releases of hazardous materials, most notably methane and radioactivity. Wooden pilings at several other locations on the property mark the spots where additional condominium structures were to be built. Two man-made, lined ponds are located along the northeastern boundary of the Captain's Cove property, and a paved road enters the property off Garvies Point Road and leads to a parking lot and a demolished condominium sales office near the property's western end. The Captain's Cove property is completely fenced along adjacent land areas; however, the property is not fenced along its southern border with the Creek. There is limited signage warning of the hazardous nature of the property.

Geology and Hydrogeology

There are two discrete aquifers in the Glen Cove region - the Upper Glacial and the Lloyd Aquifers. In addition to these, local bodies of perched groundwater occur above the water table, typically atop lenses of clay. In 1978, the aquifer system underlying Nassau and Suffolk Counties was designated a sole source aquifer by EPA in order to safeguard the capability of these aquifers to provide potable water.

The Upper Glacial Aquifer, which is not a source of potable water in the vicinity of the Site, consists of permeable deposits that occur below the water table. The water table at the Site occurs from mean sea level (MSL) to approximately 60 feet above MSL. Recharge is entirely from precipitation occurring mostly during the late fall and winter when plant growth is dormant. Regionally, shallow groundwater discharges to streams, springs, and Long Island Sound and its harbors. No connection or discharge from the Upper Glacial Aquifer to the deeper Lloyd Aquifer exists in the Site area. Groundwater movement in the Upper Glacial Aquifer is generally to the south, with shallow discharge to Glen Cove Creek (**FIGURE 4**).

The clay member of the Raritan Formation is a confining, or relatively impermeable, unit that overlies the Lloyd Aquifer. The Port Washington unit occurs above, and is contiguous with, the clay member in many places. Together, these units form an effective confining unit separating the Lloyd Aquifer from the Upper Glacial Aquifer in the Glen Cove Region. The thickness of the confining unit is about 112 feet beneath the Site, based on the log of Well 1917 (the industrial well located on Parcel A). In the Glen Cove region, discontinuous beds of low permeability sediments limit the amount of water which can be pumped from the Upper Glacial Aquifer; hence, Glen Cove's three municipal water supply wells tap the deeper Lloyd aquifer in excess of 250 feet below MSL. The three wells are located approximately one mile hydraulically up gradient of the Site to the east of the Creek (**FIGURE 5**). The potable water supply drawn from these wells is tested in accordance with State law on a regular basis.

Ecology

Wetlands at the Li Tungsten facility appear to be associated with natural drainage patterns and impoundments due to human activity. No wetland areas are depicted on either the U.S. Fish and Wildlife Service's National Wetlands Inventory Map or the NYSDEC Freshwater Wetland Map (Sea Cliff, NY quadrangle). However, four delineated areas meet the federal criteria for wetland designation on Parcels B and C. Cumulatively, they occupy one acre of the facility.

There are two surface water systems on the Li Tungsten facility property. A drainage ditch located on the eastern half of Parcel B runs south approximately two-thirds the length of the Parcel. A small pond is located approximately midway along the drainage ditch. A series of drainage ditches on the western portion of middle Parcel C end in a pond.

At Captain's Cove, precipitation collects in two man-made interconnected retention basins on the northern border of the property, as well as in low-lying areas in the center of the property. Along the southern border of the property is a four-acre tidal wetland which is inundated at high tide. None of these wet areas are located in the two ore residual areas.

Numerous on-site wildlife observations have been made, including the direct observations of many waterfowl and wading birds, as well as red foxes and raccoons. No threatened or endangered birds, mammals, reptiles, amphibians, fish, or invertebrates inhabit this area. However, Hempstead Harbor is listed as a Waterfowl Nesting Area and a Significant Coastal Fish and Wildlife Habitat under New York State's Coastal Management Program.

Several areas on both Li Tungsten and the Captain's Cove properties were found to have possible cultural resource significance.

Soil, Sediment and Surface-Water and Groundwater Contamination

As a result of the field work and sampling exercises performed during the RI at Li Tungsten and the FFS at Captain's Cove, the nature and extent of various radiological and chemical contamination was further defined at these properties. A general discussion of these findings is presented below, organized by media, e.g., soil, groundwater, etc. and contaminant, e.g., volatile organics, heavy metals, radionuclides, etc. For a more complete examination of the analytical results of the RI and FFS, please see **TABLES 1** through **4**.

Li Tungsten Facility

Surface and Subsurface Soils

Volatile organic compounds (VOCs) detected during the RI at the Li Tungsten facility were limited to a few soil samples at low concentrations (less than 5 micrograms per kilogram, or µg/kg) and at shallow depths (less than 4 feet below grade level, or bgl). VOCs were detected in three main areas: the northern portion of Parcel A; the southern portion of Parcel B; and the southern portion of Parcel C in the vicinity of the former aboveground fuel oil tank and Mud Pond. Semi-volatile organic compounds (SVOCs) were detected predominantly in the surface and subsurface soils on Parcel A, but also in the middle portion of Parcel B and the upper and lower portions of Parcel C. Concentrations of various SVOCs on Parcel A regularly exceeded 1,000 µg/kg; for example, the highest levels of benzo(a)anthracene were found in surficial soil at 3,100 µg/kg and in borings around storm sewers at 9,900 µg/kg. The levels of SVOCs on Parcels B and C were generally much lower; for example, the highest level of benzo(a)anthracene found outside of Parcel A was 360 µg/kg, in a test pit on Parcel B. No SVOCs were detected in the four soil background samples. The three parcels were also sampled for pesticides and PCBs, which were predominantly found in the central portion of Parcel B, with the highest level of total PCBs detected in a soil boring at 15,890 µg/kg. Pesticides were detected in only a few samples; the highest concentration reported was 70 µg/kg for endrin on Parcel B.

Inorganics were widely detected in the soils and included antimony, arsenic, barium, copper, cobalt, chromium, lead, manganese, mercury, nickel, radium, thorium, uranium, vanadium, and zinc. In general, many of the individual inorganic constituents had vertical and horizontal distribution patterns that were similar to one another. For example, arsenic, antimony, chromium, and manganese were found at elevated concentrations in the middle and lower portions of Parcel B, the upper portion of Parcel C and the lower portion of Parcel C in similar horizontal and vertical distribution patterns, with concentrations generally decreasing with increasing depths below 4 feet bgl. The highest concentration of antimony was 5,610 milligrams per kilogram, or mg/kg from a soil boring on Parcel B and 3,490 mg/kg from a soil boring on the lower part of Parcel C. The highest level of arsenic in soil was found in upper Parcel C at 6,300 mg/kg. The highest level of lead in soil was 6,100 mg/kg, also on upper Parcel C.

The radionuclides of concern include Uranium-238 (^{238}U), Radium-226 (^{226}Ra), Radium-228 (^{228}Ra), Thorium-230 (^{230}Th) and Thorium-232 (^{232}Th). These are constituents of the ores processed at the Li Tungsten facility or otherwise waste products of the manufacturing processes there, and also detected at the facility within the top 4 feet bgl. The radionuclides ^{238}U, ^{232}Th, and ^{226}Ra were detected primarily in five main areas: outside the fence along Herbhill Road in the northwest corner of Parcel A, the middle portion of Parcel B, the upper portion of Parcel C, the vegetated area north of the Dickson Warehouse on Parcel C, and the lower portion of Parcel C. The highest concentrations of ^{238}U (470 picocuries per gram, or pCi/g) and ^{226}Ra (250 pCi/g) were found on the upper portion of Parcel C, while ^{232}Th was found at 220 pCi/g in the middle of Parcel C.

Groundwater

Three rounds of groundwater samples were collected in December 1996, January 1997, and October 1998. Thirty-two monitoring wells were sampled in each of the first two rounds. In the third round, only twenty-eight wells were sampled as a result of the decommissioning of four wells during earlier RI/FS and removal activities. Low-flow sample collection techniques were used during the third round to minimize turbidity and any resulting potential bias in analytical results.

Groundwater analytical results indicated that contaminants which were found in soil were also generally found in groundwater. SVOCs and pesticides were generally found in trace amounts, except in the four wells immediately north of the Mattiace Site; contamination found in these wells has resulted from past commercial operations on the Mattiace property and is now being remediated by EPA under the Mattiace Superfund cleanup program. PCBs were not detected in any groundwater samples.

The most concentrated plume of VOCs was detected in four wells immediately north of the Mattiace Site. This plume is attributable to the leaking underground storage tanks that were removed from the Mattiace Site by EPA in 1996/97; these tanks had concentrations of trichloroethylene (TCE) as high as 34,000 micrograms per liter, or ug/L. EPA subsequently constructed a groundwater and soil treatment facility at Mattiace to remediate the source as well as to capture and treat the groundwater plume. The Mattiace Site remedial facility is presently in the start-up phase of operation. Another less concentrated plume of VOCs was also detected in the middle portion of Parcel A/lower portion of Parcel B, down gradient of the Crown Dykman State Superfund site, which is the suspected source. During the second round of sampling, the concentrations of TCE and the dry cleaning chemical tetrachloroethylene (PCE) were measured at 2,200 ug/l and 6,900 ug/l, respectively, in well GM-1 located on the northern part of Parcel A, directly across the street from Crown Dykman, a former dry cleaning facility. In the almost two years between the second and third sampling rounds, concentrations of VOCs have diminished in wells close to Crown Dykman, e.g., TCE decreased to 9 ug/l in GM-1. However, evidence that VOCs have increased in wells closer to the Creek, e.g., TCE in well MP-2D near the Creek has been measured sequentially at 87 ug/l, 96 ug/l, and 650 ug/l during the three sampling rounds, suggests that the bulk of the VOCs may have moved further south. The VOCs in groundwater under the Li Tungsten facility are not thought to have originated from the Li Tungsten operations. However, in response to the migrating plume of VOC contamination suspected of emanating from the Crown Dykman Site, the NYSDEC may require future access to portions of Parcel A. This is necessary to allow the State to address this migrating plume if a groundwater remedy is necessary. The preferred treatment alternative for this area will be detailed in the State's future Record of Decision for the Crown Dykman Site.

Inorganics of concern were detected in groundwater samples above EPA maximum contaminant levels (MCLs) in several locations, but in no clearly defined areal pattern. The vertical and horizontal distribution patterns for individual inorganics were similar. Most of the elevated levels were not significantly above MCLs, although levels of arsenic and antimony as high as 14,500 ug/l and 4,300 ug/l, respectively, were detected in a well near the former aboveground fuel oil tank on lower Parcel C. EPA's MCLs for arsenic and antimony are 50 ug/l and 6 ug/l, respectively. Radionuclides, although found to be above background in several wells on-Site, generally met or, in a few instances, only slightly exceeded standards. The elevated levels of radionuclides also do not appear to form a recognizable plume or pattern of contamination. In the third round of groundwater sampling, all of the radionuclides of concern met standards except for Ra^{228}, which in one well slightly exceeded the EPA standard for that contaminant.

Ponded Water and Wetlands

Seven water samples were collected from the ponds and wetland areas on Parcels A, B, and C. VOCs were not detected in surface water on Parcels B and C. SVOCs (e.g., bis(2-ethylhexyl)phthalate at 4 ug/l) exceeded the NYSDEC Class C Surface Water Standard of 0.6 ug/l on Parcel C. PCBs/pesticides (e.g., aroclor 1254/1260 at 3.8 ug/l and 4,4'-DDD at 9.1 ug/l) were detected in three locations in excess of NYSDEC Class D Surface Water Standards (total PCBs=0.01 ug/l and 4,4'-DDD=0.001 ug/l, respectively). A significant number of inorganics in the ponded water exceeded the State water quality standards and guidance values on Parcels B and C, the highest being arsenic, which was detected at 8,090 ug/l in ponded water on Parcel B. Radionuclides were generally found to be within surface water quality standards.

Pond/Wetlands Sediments

Eight sediment samples were collected from the ponds and wetland areas on parcels adjacent to surface water sample locations on Parcels A, B, and C. VOCs were generally detected in trace levels in most of these samples, although acetone was detected at a concentration of 240 µg/kg on Parcel B. SVOCs were generally detected in all the samples; the highest SVOC level detected was 290 µg/kg of benzo(a)anthracene. PCBs were detected in three of the eight sediment samples, with the highest level of 2,891 µg/kg total PCBs found in lower Parcel C. The NYSDEC screening level for total PCBs is 328 µg/kg, according to the NYSDEC Technical Guidance for Screening Contaminated Sediments.

Inorganics that were detected in significant concentrations in each of the eight sediment samples included antimony, arsenic, calcium, chromium, cobalt, copper, iron, lead, mercury, nickel, selenium, silver, sodium, and zinc. Arsenic, for example, was reported at a maximum concentration of 2,080 mg/kg on Parcel C. Radionuclides were found in low but significant concentrations on the lower part of Parcel C (two Mud Holes and Mud Pond), e.g., ^{238}U at 46 pCi/g.

Additionally, four storm sewer sediment samples were also collected from storm sewers on Parcel A. Trace levels of several VOCs were detected in each of the four storm sewer sediment samples. SVOCs were detected in each of the four storm sewer sediment samples in significant concentrations, e.g., 13,000 µg/kg of pyrene. PCBs were detected in each of the four storm sewer sediment samples at generally low levels, with a maximum of 853 µg/kg of total PCBs in a storm sewer on Parcel A.

Inorganics detected in significant concentrations in each of the four storm sewer sediment samples included antimony (maximum 477 mg/kg) and arsenic (maximum 454 mg/kg). Chromium, cobalt, copper, iron, lead, mercury, nickel, selenium, silver, and zinc were also detected in significant concentrations. Radionuclides were found in low but significant concentrations in all four storm sewer sediment samples, e.g., ^{238}U at 29 pCi/g.

Captain's Cove Property

Surface and Subsurface Soils

At the Captain's Cove property, a gamma survey as well as samples obtained from soil borings and monitoring wells confirmed that the radionuclides which were the focus of EPA's FFS were limited to two separate areas of the property, denoted as Area A (northwest corner) and Area G (east end). To develop a complete contaminant profile within the two radionuclide areas, EPA also sampled for a standard array of non-radioactive hazardous chemicals. VOCs were primarily limited to several samples in the northeast portion of Area A, generally in concentrations below 400 µg/kg, except for one subsurface soil sample containing chlorobenzene at 42,000 µg/kg. Seven SVOCs were detected at concentrations exceeding NYSDEC's recommended soil cleanup objectives identified in the Technical and Administrative Guidance Memoranda (TAGM) in six locations in Area A, four locations in Area G, and one location not associated with either area, e.g., benzo(b)fluoranthene at 1,200 µg/kg in SB-4 (soil boring no. 4). One sample from Area A and one from Area G had significant concentrations of total PCBs, i.e., SB-21 at 5,500 µg/kg in Area A, and TP-6 (test pit no. 6) at 12,000 µg/kg in Area G. Numerous inorganics were detected frequently in Areas A and G at concentrations exceeding NYSDEC's soil cleanup objectives, e.g., arsenic exceeded its TAGM value in 23 samples, with the highest measured concentration at 2,760 mg/kg in Area A.

In Area A, elevated concentrations (greater than 2.5 times background) of thorium and uranium series radionuclides were found in all five test pits and seven of the 15 soil/monitoring well borings. The remaining soil borings reflected radionuclide concentrations that ranged from background (generally about 1 pCi/g for each of the radionuclides of concern) to less than 2.5 times background. The maximum concentrations of radionuclides in test pit samples were found at 2 to 6 feet bgl in TP-3. At this location, uranium series concentrations ranged from 191 to 494 pCi/g, and thorium series concentrations ranged from 56 to 113 pCi/g. Elevated concentrations of radionuclides were also found in soil boring samples. Maximum concentrations of 211 to 273 pCi/g for the uranium series and 70 to 126 pCi/g for the thorium series radionuclides were measured at a depth of 6 to 7 feet bgl in SB-13. Several soil borings exhibited contamination at similar depths throughout Area A.

In Area G, concentrations of thorium and uranium series radionuclides greater than 5 pCi/g were found in both test pits (TP-5 and TP-6) and five of the eight soil/monitoring well borings. The remaining three soil borings reflected radionuclide concentrations that ranged from background to less than 2.5 times background. In samples collected from the test pits, the highest concentrations of ^{226}Ra and ^{228}Ra were found at 4 to 6 feet bgl in TP-6 and ranged from 13 to 28 pCi/g and 4 to 6 pCi/g, respectively. In the soil borings, the highest concentrations of ^{226}Ra and ^{228}Ra were found at 6 to 8 feet bgl in SB-8 and measured 169 pCi/g and 49 pCi/g, respectively. The highest radionuclide concentration was 1,041 pCi/g of ^{234}U measured in SB-23.

<u>Groundwater</u>

Eleven wells were sampled as part of one round of groundwater sampling performed at Captain's Cove. The objective of the sampling was to assess whether the groundwater has been impacted by the radionuclides of concern; however, samples were also analyzed for other chemical categories, such as VOCs, heavy metals, pesticides/PCBs, etc. The highest concentrations of the uranium (7 picoCuries per liter, or pCi/L) and thorium (8 pCi/l) series radionuclides were measured in MW-7 and MW-2, respectively. The highest value for the sum of ^{226}Ra and ^{228}Ra was 4.83 pCi/l measured in MW-3. The MCL for the sum of ^{226}Ra and ^{228}Ra is 5 pCi/l and the gross alpha MCL is 15 pCi/l. While there are no specific drinking water standards for uranium and thorium, thorium concentrations at the Site do not cause contravention of the gross alpha MCL.

Several wells on the property also were contaminated with significant levels of nonradioactive hazardous substances, such as VOCs and inorganics. A total of eight VOCs were detected in significant concentrations in the northeast part of the property, and are likely part of the plume related to the Mattiace Site. SVOCs and PCBs/pesticides were generally either not detected or found at low levels in no particular pattern. Inorganic compounds such as arsenic, antimony, selenium, iron, and manganese were detected in significant amounts in several wells.

<u>Ponded Water</u>

Three samples were collected from each of the two retention ponds and from a topographic depression in the southwest portion of the Captain's Cove property. Radionuclides were found to be within surface water quality standards. No VOCs, SVOCs, pesticides, or PCBs were detected in the three surface water samples. Many of the inorganics detected in the topographic depression exceeded New York State or EPA Ambient Water Quality Criteria.

Sediments

Seven sediment samples were collected on the property; five from the large wetland area along the southern border, one from a retention pond area, and one from the topographic depression in the southwest corner. The concentrations of radionuclides in all sediment samples were within the range of background concentrations. No SVOCs or PCBs were detected in sediment samples. While VOCs and pesticides were found in the topographic depression, the levels were generally low. Several inorganics, such as iron, mercury, lead, silver, and zinc were detected in the topographic depression at concentrations significantly above background values.

Glen Cove Creek

No samples of sediments or surface water were collected from Glen Cove Creek as part of the Li Tungsten field work, as there is a routine monitoring program for the entire Creek being performed pursuant to the June 1991 ROD for the Mattiace Superfund site. Given the industrial nature of this area, there are many potential sources of contamination in the Creek. The monitoring program was not designed to identify the specific sources of specific contaminants; it consists of four locations along the length of the creek which are analyzed for VOCs, SVOCs, inorganic contaminants, pesticides and PCBs. The results of the first two monitoring events are provided in the RI report, while the results for the third monitoring event are provided in the FS. The third event, conducted in Summer 1998, generally support a decreasing trend in overall contaminant concentrations in the Creek sediments over the past nine years.

The US Army Corps is about to initiate the second phase of the dredging of the Creek as part of the Glen Cove Creek Federal Navigation Project authorized by the Rivers and Harbors Act. The "maintenance dredging" is intended to restore adequate depth to the channel to provide safe navigation for barges and other vessels. The second phase of the project entails maintenance dredging of the Creek from mile 0.3 to mile 1.0; the entire width of the Creek fronting Parcel A will be dredged to a depth of 8 feet, with the exception of a very small area of Creek fronting the westernmost side of the Parcel, which already provides an 8 foot channel. Approximately 35,000 cy of material will be dredged and transported by pipeline to Parcel A for de-watering. The first phase of the project performed in 1996 was conducted at the mouth of the Creek (mile 0 to mile 0.3); approximately 12,000 cy of sediment was removed as part of this effort. Prior to performing the first phase of the dredging, the Army Corps sampled the length of the Creek in order to evaluate disposal options for the removed sediment; these results are provided in the FS.

The beneficial impact of the dredging of the mouth of the Creek was clearly evident in the third sampling event. The sampling results for the westernmost sampling location (GC-03), located in the dredged area, detected arsenic at a maximum concentration of 15.9 mg/kg and lead at 181 mg/kg. VOCs were not detected in this location, except for acetone in very low concentrations. In general, the third sampling event results when compared to the two previous events, indicated decreasing levels of SVOCs, although an increase was detected in the easternmost sampling location (maximum concentrations of benzo(a)anthracene and benzo(a)pyrene 2,300 and 1,900 ug/kg, respectively). Low levels of pesticides continue to be found in the Creek, and PCBs were also recorded in concentrations ranging from 69 to 240 ug/kg. Analyses were not performed for radionuclides from the uranium and thorium series, but previous sampling has indicated no radioactive contamination above background levels.

SUMMARY OF SITE RISKS

Based upon the results of the RI and the FFS, baseline risk assessments were conducted to estimate the human and ecological risks associated with current and future Site conditions. A baseline risk assessment estimates the human health and ecological risk which could result from the contamination at the Site, if no remedial action were taken.

The assessments conducted for this Site include separate chemical and radiological risk assessments for both human health, as well as for flora and fauna. For human health, risks were estimated for current receptors, as well as for future receptors in both residential and commercial scenarios. EPA believes that, based on historical uses of the Li Tungsten and Captain’s Cove properties and the City’s Glen Cove Creek Revitalization Plan, the most reasonably anticipated future land use of the Li Tungsten Site is most likely to be commercial. However, EPA evaluated residential as well as commercial future risks and hazards to populations, primarily as a result of a request from the Li Tungsten Task Force to evaluate the risk to potential future residential populations on the Site. Separate cancer risks were evaluated for both chemical and radiological exposures, and a total cancer risk was also calculated and is presented in the Tables for the main chemical contributors. In addition, noncancer human health hazards were evaluated for chemical exposures. The general methodology used in performing human health risk assessment is presented below.

Human Health Risk Assessment

A four-step process is utilized for assessing Site-related human health risks for a reasonable maximum exposure scenario: *Hazard Identification*--identifies the contaminants of concern at the Site based on several factors such as toxicity, frequency of occurrence, and concentration. *Exposure Assessment*--estimates the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways (e.g., ingesting contaminated well-water) by which humans are potentially exposed. *Toxicity Assessment*--determines the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of adverse effects (response). *Risk Characterization*--summarizes and combines results of the exposure and toxicity assessments to provide a quantitative assessment of Site-related risks.

Current Federal guidelines for acceptable exposures are an individual lifetime excess carcinogenic risk to a reasonably maximally exposed individual in the range of 10^{-4} to 10^{-6} (e.g., a one-in-ten-thousand to a one-in-a-million excess cancer risk or likelihood of an additional incidence of cancer) and a Hazard Index (HI) (which reflects noncarcinogenic effects for a human receptor) equal to 1.0. An HI greater than 1.0 indicates a potential for noncarcinogenic health effects.

For purposes of the risk assessment, the Li Tungsten facility was separated into the following areas:

Area A	=	Parcel A
Area B	=	lower Parcel B
Area B + C	=	middle/upper Parcel B combined with middle/ upper Parcel C
Area C	=	lower Parcel C

The Captain’s Cove property was separated into Area A and Area G. For both properties, the groundwater data is Site-wide.

Hazard Identification

During data evaluation, relevant site information is compiled and analyzed, in order to select contaminants of concern (COC). For the Li Tungsten Site, several radionuclides, inorganic chemicals, and organic compounds meeting appropriate QA/QC requirements were selected as COCs because of the potential hazard they pose to human health and the environment under current and future conditions. Predominant contributors to the risk estimates for contaminated soil calculated at both the Li Tungsten facility and Captain's Cove property included inorganic chemicals such as arsenic, manganese, cobalt, lead and antimony, as well as thorium and uranium series radionuclides. Predominant contributors to hypothetical groundwater risks were VOCs such as trichloroethylene, tetrachloroethylene, chloroform, methylene chloride, and vinyl chloride, and inorganics such as arsenic and antimony.

Soil data (i.e., surface soil and a composite of samples across various depths) were evaluated to determine risk at the Li Tungsten facility by dividing the Site into four areas (Areas A, B, B + C, and C) to more realistically assess inhalation risks to nearby receptors, as well as to evaluate exposures from areas of similar contaminants, e.g., the ore dumping areas of middle/upper Parcel B and middle/upper Parcel C.

The COCs were selected based on chemicals exceeding the upper bound of the cancer risk range (i.e., 1 in 1,000,000) or a Hazard Index of 1. The COCs are categorized based on areas and parcels for soil and site-wide data for groundwater. **Tables 5A-F** summarize the COCs, and exposure point concentrations for each of the COCs detected in soil at the Li Tungsten facility. Exposure point concentrations (EPCs) are defined as the concentrations used in estimating the exposure. Separate EPCs were developed for each COC in the soil, sediment, surface water and groundwater for specific portions of the Site. Separate modeling of air particulates for the off-site resident and worker were calculated and are shown in **Table 5F**. The tables include the range of concentrations detected for each COC, as well as the frequency of detection, the EPC, and the derivation of the EPC. Arsenic, antimony, lead and manganese had the highest frequency of detection in soil. Volatile organic compounds (VOCs) including benzene, vinyl chloride, and trichloroethylene were the primary chemicals found in groundwater.

For the Captain's Cove property, **Tables 6A-E** summarize the COCs, frequency of detection, and EPC for the COCs. A similar categorization scheme was used for Areas A and G on the property and for the site-wide groundwater COCs.

Exposure Assessment

Exposure point concentrations were calculated from soil sample data sets to represent the reasonable maximum exposure (RME) to various current and hypothetical future individuals on and around the Li Tungsten facility and Captain's Cove property. **Tables 7 and 8** provide conceptual site models of potential exposures for Li Tungsten and Captain's Cove, respectively. Specifically, current exposures were calculated for children and adults living off-Site (i.e., at the boundaries of the property) who may be exposed through wind-blown dust. The dust EPC was calculated using the results of the Industrial Source Complex Short-term model. Other populations evaluated include: adolescent trespassers who may enter the property without authorization and hypothetical future individuals such as adult and child residents, adolescent trespassers, Site workers and construction workers at both properties. Future residential receptors were evaluated primarily for reference value, since EPA believes that the future use of the Site will be commercial.

At the Li Tungsten facility, the exposures evaluated included soil and groundwater ingestion and dermal contact at ground surface and a composite sample of several soil borings at depth. Other routes of exposure include: future residential use of groundwater including inhalation of volatilized organics while showering. The air concentrations in the shower were modeled. Off-Site residents may also be exposed through inhalation of wind-blown dust based on modeled concentrations. Other exposed populations include: construction workers who would be on the property for a shorter period of time than the on-Site workers who were also evaluated.

For the Captain's Cove property, similar populations were evaluated i.e., child and adult future resident, adolescent trespasser, on-Site worker, and construction worker. **Table 8A and 8B** provide conceptual models for the radiological portion of the assessment as well as the chemical assessment, respectively.

Many of the soil sample locations were biased, i.e., they were selected due to the presence of elevated levels of contaminants. Therefore, the values calculated on those data sets are a conservative estimate of the RME. In addition, the wind-blown dust concentrations were modeled using the Industrial Source Complex Short-term model.

In addition to the calculation of exposure point concentrations (**Tables 5A-F and 6A-F**), several Site-specific assumptions regarding future land-use scenarios and exposure pathways, e.g., inhalation, ingestion, and dermal contact, were made. Assumptions were based on Site-specific conditions to the greatest degree possible, and default parameter values found in EPA risk assessment guidance documents were used in the absence of Site-specific data.

Toxicity Assessment

Standard dose conversion factors, oral and inhalation cancer slope factors, and oral and inhalation reference doses were used to estimate the carcinogenic and noncarcinogenic hazards associated with Site contaminants. Tables **9A-E** (Li Tungsten) and **10A-E** (Captain's Cove) provide the chronic toxicity information for the COCs based on information in the Integrated Risk Information System (IRIS), the 1997 Health Effects Assessment Summary Tables, and

EPA's National Center for Environmental Assessment Superfund Technical Support Team. The risk estimators used in this assessment are accepted by the scientific community as representing reasonable projections of the hazards associated with exposure to the various COCs.

At this time, cancer slope factors and Reference Doses are not available for the dermal route of exposure. Thus, the dermal slope factors used in the assessment have been extrapolated from oral values using appropriate adjustment factors based on data on the chemical's absorption. Adjustments in the oral cancer slope factors and Reference Doses are listed in **Tables 9A and 10A** for the Li Tungsten facility and Captain's Cove property, respectively.

A number of chemicals lack adequate toxicity information to quantify the potential risks and hazards associated with exposure. A list of the chemicals not quantitatively evaluated are provided in the Li Tungsten RI and Captain's Cove FFS documents. Lack of data to quantify risks and hazards for these chemicals may potentially underestimate the risks and hazards at the Site.

Human epidemiological data on carcinogenesis from exposure to ionizing radiation are more extensive than that for most chemical carcinogens. The cancer slope factors were obtained from IRIS or the 1995 Health Effects Assessment Summary Tables consistent with EPA guidance.

Risk Characterization

The Risk Characterization summarizes the risks and hazards for chemical contaminants through various routes of exposure. For carcinogens, risks are generally expressed as the incremental probability of an individual's developing cancer over a lifetime as a result of exposure to carcinogens. Risk is a function of the chronic daily intake averaged over a 70-year period and the cancer slope factor that indicates the relative cancer potential of the chemical.

The potential for non-carcinogenic effects is evaluated by comparing an exposure level over a specified time with a Reference Dose. The Reference Dose represents a level that an individual may be exposed to that is not expected to cause any deleterious effects. The ratio of exposure to toxicity is represented as a Hazard Quotient. Hazard Quotients less than 1 indicate that a receptor's dose of a single contaminant is less than the RfD, and that toxic non-carcinogenic effects from that chemical are unlikely. The Hazard Index is the sum of multiple chemical exposures across multiple routes.

Li Tungsten Facility

The risks presented in **Tables 11A-F** for the Li Tungsten facility and **12A-E** for the Captain's Cove property summarize the cancer risks from chemical and radiological exposure for those chemicals and radionuclides with risks greater than 1 in 1,000,000. The analysis for individual receptors is identified based on Areas A, B, B + C, and C. Risks to the off-Site population and through groundwater were developed based on Site-wide groundwater information and an air dispersion model.

A similar procedure was followed for the evaluation of non-carcinogenic hazards. **Tables 13A-F** summarize the hazards for specific receptors based on exposure locations at the Li Tungsten facility. Tables **14A-F** summarize the hazards for the non-carcinogenic chemicals.

Lead was evaluated qualitatively based on the 1994 OSWER Directive and a screening level of 400 mg/kg. A quantitative evaluation was not possible based on the lack of specific toxicity factors.

<u>Chemical Risk</u>

Table **11A-F** and **13A-F** summarize the risk and hazard estimates for the significant routes of exposure (i.e., inhalation, dermal, ingestion and external radiation) for various receptors at the Li Tungsten facility. These risk estimates are based on a reasonable maximum exposure and were developed by using various exposure assumptions based on route of exposure and individual exposures (i.e., child, adult, worker).

Chemical analyses of soil samples at the Li Tungsten facility showed that inorganics, e.g., heavy metals like arsenic, manganese, cobalt, antimony, and nickel, are present in all four areas at concentrations that may pose unacceptable risks and hazards depending on activities. These metals are the predominant contributors to unacceptable human health risks calculated for all areas of the Li Tungsten facility. The carcinogenic risks for these metals primarily exceeded 1×10^{-4} for arsenic through the ingestion, inhalation and dermal pathways. The risks through ingestion of Site-wide groundwater were also predominated by arsenic with VOCs also contributing to the total risk. The radionuclides also resulted in exceedences of the upper bound of the risk range i.e., 1×10^{-4}. These elevated risks were seen for current trespassers, and future land use including commercial development and residential land use. Risks to construction workers and future Site workers also exceeded the upper bounds of the risk range.

For several populations evaluated, including both residential and commercial scenarios, the total excess lifetime cancer risk and hazard indices that were estimated based on exposure to these contaminants exceeded the cancer risk range of 10^{-4} to 10^{-6} and the Hazard Index of 1 used in evaluating Superfund sites. For example, the future commercial Site worker's exposure to the chemicals of concern in Areas B + C during future commercial activities would result in an unacceptable cancer risk of $5x10^{-3}$ (or an increased risk of 5 in 1,000) based on specific exposure assumptions. Likewise, the same Site worker's exposure to heavy metals (primarily from arsenic) would contribute to a noncancer hazard index of 40. A future child resident's exposure to the chemicals of concern in Area C would result in an unacceptable cancer risk of $6.0x10^{-3}$ and a noncancer HI of 300, as a result of exposure to arsenic and antimony. Likewise, a current off-Site child resident's exposure to the chemicals of concern from inhalation would result in a noncancer HI of 90, although this risk is based on highly conservative modeling and does not account for vegetative soil cover at the Site, which significantly reduces the potential for off-Site windblown transport of contaminated dust. A review of the calculated risks and hazards indicate that the most highly contaminated soil is located in Area B + C.

Potential exposure of an adolescent trespasser to ponded water and sediments on Parcels B and C also results in unacceptable hazard indices (4 and 7, respectively) due to the presence of arsenic. Hypothetical exposure to groundwater underlying the facility, although unlikely, would result in unacceptable cancer risks and hazard indices to residential occupants and commercial Site workers through ingestion, inhalation while showering, and dermal contact. The primary chemicals contributing to these risks include inorganics such as arsenic and volatile organics like trichloroethene, tetrachloroethene, and vinyl chloride. Exposure to the contaminated groundwater in the Upper Glacial Aquifer underlying the facility is considered unlikely because of the general availability of Glen Cove's municipal water supply. This supply, which is periodically tested to ensure its quality in accordance with New York State law, is pumped from the deeper Lloyd Aquifer at locations approximately one mile hydraulically up gradient from the Site.

At the Captain's Cove facility the chemical risks exceeded the upper bound of the risk range for future adult site workers i.e., 6 in 100 primarily based on arsenic exposure. The risks to the construction worker were elevated at 5 in 10,000 primarily based on arsenic exposure. Similar elevated risks were also found for the future adult and child residents.

The non-cancer hazards also exceeded 1 at the Li Tungsten and Captain's Cove properties. **Tables 13A-F** and **14A-F**, respectively, summarize the hazards by specific organ groups. At Li Tungsten the hazards were consistently above 1 for each receptor group with arsenic as the primary contributor. Under the current scenario, the adolescent trespasser had an elevated hazard of 6 in Area B, 19 in Area B + C, and 5 in Area C. An elevated hazard of 4 from sediment exposure was also identified. Similar hazards were found for the future Site worker (HI = 30 for arsenic exposure in Area B + C) and construction worker (HI = 30 for surface soil exposure in Area B + C). Elevated HIs were also found for arsenic in groundwater (i.e., 50 for the future adult residents).

At the Captain's Cove property, the non-cancer hazards were also elevated for the future construction worker (i.e, HI = 91 for manganese and HI of 12 for arsenic in Area A and HI of 900 for manganese in Area G). Similar hazards were identified for the future child and adult resident.

Lead

Lead was identified as a contaminant of concern at the Li Tungsten and Captain's Cove properties. At Li Tungsten, lead in soil ranged from 30 to 3,710 mg/kg in Area B and 4 to 19,600 mg/kg in Area B + C. A similar pattern was found in Area C with lead concentrations ranging from 8.3 to 5,140 mg/kg. These levels were significantly above the background concentration of 3.9 to 103 mg/kg. The levels in groundwater also exceeded the current EPA Action Level.

At Captain's Cove, lead in soil ranged from 95.1 to 512 mg/kg. In Area G, the maximum lead concentration was 3,000 mg/kg.

Radiological Risk

Radionuclide analyses of soil samples showed that thorium and uranium series radionuclides are present in all areas at concentrations that exceed the range of normal background. For several populations evaluated, including both residential and commercial scenarios, the total excess lifetime cancer risk estimates due to exposure to these radioactive contaminants for all four areas evaluated exceed the cancer risk range of 10^{-4} to 10^{-6}. For example, a Site worker's exposure to radionuclides in Area B + C in a commercial future-use scenario would result in an unacceptable cancer risk of $1.4x10^{-2}$ (or a risk of approximately 14 in 1,000). Similarly, an adult resident living in Area B + C would result in an excess cancer risk from exposure to radionuclides of 1.9 $x10^{-3}$ (or a risk of approximately 19 in 10,000). As reflected in the risk calculations, the soil most highly contaminated with radionuclides was found in Area B + C.

Radionuclides in sediments and groundwater were found at very low levels and would not pose an unacceptable risk.

Ecological Risk Assessment

The purpose of the ecological risk assessment was to evaluate environmental samples for Site-related contaminants and to estimate any potential risks that these contaminants may pose to the environment. The ecological assessment included a risk characterization of chemical contaminants in ponded water/wetlands and sediments and surface soil for aquatic, semi-aquatic and terrestrial receptors. Also, a separate risk characterization for radionuclides occurring in surface water, sediment and surface soil, for aquatic, semi-aquatic and terrestrial receptors was performed.

A four-step process is utilized for assessing Site-related ecological risks for a reasonable maximum exposure scenario:

- ❑ *Problem Formulation* - a qualitative evaluation of contaminant release, migration, and fate; identification of contaminants of concern, receptors, exposure pathways, and known ecological effects of the contaminants; and selection of endpoints for further study.

- ❑ *Exposure Assessment* - a quantitative evaluation of contaminant release, migration, and fate; characterization of exposure pathways and receptors; and measurement or estimation of exposure point concentrations.

- ❑ *Ecological Effects Assessment* - literature reviews, field studies, and toxicity tests, linking contaminant concentrations to effects on ecological receptors.

- ❑ *Risk Characterization* - measurement or estimation of both current and future adverse effects.

Wildlife near the Li Tungsten facility may have incidental contact with or ingest contaminants while foraging, nesting, or engaging in other activities in the terrestrial portions of the Site. Chemical contaminants can also adversely affect plants and animals in surrounding habitats via the food chain. Contaminants in ponded water may be taken up by aquatic life as well as semi-aquatic and terrestrial wildlife. Receptor species chosen were considered representative of the local wildlife populations that would use and frequent the Li Tungsten area. The receptors chosen were: aquatic invertebrates, fish, reptiles, and amphibians; mallard; meadow vole; raccoon; herbaceous terrestrial vegetation; American robin; deer mouse; and red fox. Exposure media of ecological concern included surface soils, surface water, and sediment.

The Hazard Quotient (HQ) method was used to characterize risks to receptor species. If an HQ exceeds 1, there is concern for possible adverse effects. The results of the ecological risk characterization indicate that many of the chemicals of concern in ponded water/sediments and soil at the Li Tungsten facility had HQs which exceeded 1, and in some cases ranged up to and beyond 10,000. The highest HQs were exhibited for mallard, raccoon, earthworm, robin, deer mouse and red fox, resulting primarily from inorganics like arsenic, copper, lead, nickel, selenium and zinc.

Captain's Cove Property

Chemical Risk

Chemical analyses of soil samples showed that inorganics, e.g., heavy metals like arsenic, manganese, and antimony, and PCBs are present in Areas A and G at concentrations that pose an unacceptable human health risk. For primarily the residential and construction worker scenarios, the hazard indices and total excess lifetime cancer risk estimates due to exposure to these contaminants exceed the cancer risk range of 10^{-4} to 10^{-6} and the Hazard Index of 1 used in evaluating Superfund sites. For example, an adult resident's exposure to the chemicals of concern in Area A in a residential future-use scenario would result in an unacceptable cancer risk of $9x10^{-3}$ (or a risk of approximately 9 in 1,000). Similarly, the same adult resident in Area G would be exposed to chemicals resulting in a cancer risk of $1.0x10^{-3}$ (or a risk of approximately 1 in 1,000). Construction workers in Areas A and G would be exposed to chemicals that contribute to hazard indices of 100 and 900, respectively.

Potential exposure to surface water and sediment on the Captain's Cove property does not result in unacceptable hazard indices or in cancer risks which exceed the risk range. Hypothetical exposures to groundwater underlying the property, although unlikely because of the high level of dissolved solids in the aquifer from saltwater intrusion as well as the availability of the City public water supply, would result in unacceptable hazard indices to residential occupants and commercial Site workers, and unacceptable cancer risks to residents, with arsenic as the predominant contributor to risk.

Radiological Risk

Radionuclide analyses of soil samples showed that thorium and uranium series radionuclides present at Area A and Area G are at concentrations which exceed the range of normal background. For several populations evaluated, including both residential and commercial scenarios, the total excess lifetime cancer risk estimates due to exposure to these radioactive contaminants exceed the cancer risk range of 10^{-4} to 10^{-6}.

As reflected in the risk calculations, the soils in both Areas A and G pose a similar degree of unacceptable cancer risk to future Site workers. The cancer risk in Area A was calculated to be $2.5X10^{-4}$ (or a risk of approximately 25 in 100,000), while the cancer risk in Area G was calculated to be $1.1 X10^{-4}$ (or a risk of approximately 11 in 100,000), predominantly from external gamma radiation. Further, a future adult resident living in Area A would be exposed to an excess cancer risk from exposure to radionuclides of $3.8 x10^{-2}$ (or a risk of approximately 38 in 1,000); in Area G, the same resident would be exposed to a risk of $3x10^{-2}$ (or a risk of approximately 3 in 100). Radionuclides in sediments and groundwater were found not to pose unacceptable risk.

Discussion of Uncertainties in Risk Assessment

The procedure and inputs used to assess risks in this evaluation, as in all such assessments, are subject to a wide variety of uncertainties. In general, the main sources of uncertainty include:

- environmental chemistry sampling and analysis;
- environmental parameter measurement;
- fate and transport modeling;
- exposure parameter estimation; and,
- toxicological data.

Uncertainty in environmental sampling arises, in part, from the potentially uneven distribution of chemicals in the media sampled. Consequently, there is significant uncertainty as to the actual levels present. Environmental chemistry-analysis error can stem from several sources, including the errors inherent in the analytical methods and characteristics of the matrix being sampled.

Uncertainties in the exposure assessment are related to estimates of how often an individual would actually come in contact with the contaminants of concern, the period of time over which such exposure would occur, and in the models used to estimate the concentrations of the contaminants of concern at the point of exposure.

Uncertainties in toxicological data occur in extrapolating both from animals to humans and from high to low doses of exposure, as well as from the difficulties in assessing the toxicity of a mixture of chemicals. These uncertainties are addressed by making conservative assumptions concerning risk and exposure parameters throughout the assessment. As a result, the baseline human health risk assessment provides upper-bound estimates of the risks to populations near the Site, and it is highly unlikely to underestimate actual risks related to the Site.

Specifically, several aspects of risk estimation contribute uncertainty to the projected risks. EPA recommends that the arithmetic average concentration of the data be used for evaluating long-term exposure and that, because of the uncertainty associated with estimating the true average concentration at a site, the 95% upper confidence limit (UCL) on the arithmetic average be used as the exposure point concentration. The 95% UCL provides reasonable confidence that the true average will not be underestimated. Exposure point concentrations were calculated from soil sample data sets to represent the reasonable maximum exposure (RME) to various current and hypothetical future populations on and around the Li Tungsten and Captain's Cove properties. Many of the soil sample locations were biased, i.e., they were selected due to the presence of elevated levels of contamination. Therefore, the UCL values calculated on those data sets are a conservative estimate of the RME. In fact, the true UCL values on the actual distributions of chemicals of concern in soil are less than the values calculated from the analytical data. Uncertainty associated with sample laboratory analysis and data evaluation is considered low as a result of a rigorous quality assurance program which included data validation of each sample result.

In addition to the calculation of exposure point concentrations, several site-specific assumptions regarding future land use scenarios, intake parameters, and exposure pathways are a part of the exposure assessment stage of a baseline risk assessment. Assumptions were based on site-specific conditions to the greatest degree possible, and default parameter values found in EPA risk assessment guidance documents were used in the absence of site-specific data. However, there remains some uncertainty in the prediction of future use scenarios and their associated intake parameters and exposure pathways. The exposure pathways selected for current scenarios were based on the site conceptual model and related RI and FFS data. The uncertainty associated with the selected pathways for these scenarios is low because site conditions support the conceptual model.

Standard dose conversion factors, risk slope factors, and reference doses are used to estimate the carcinogenic and noncarcinogenic hazards associated with site contaminants. The risk estimators used in this assessment are generally accepted by the scientific community as representing reasonable projections of the hazards associated with exposure to the various chemicals of potential concern.

Human epidemiological data on carcinogenesis from exposure to ionizing radiation are more extensive than that for most chemical carcinogens. However, these data are based primarily upon studies of populations exposed to radiation doses and dose rates that are higher than the levels of concern at the Li Tungsten/Captain's Cove site. Use of these data to predict excess cancer risk from low-level radiation exposure requires extrapolation based upon somewhat uncertain dose-response assumptions.

Results calculated from using the RESRAD computer model were used to present the cancer risks for the radiological portion of the Li Tungsten and Captain's Cove risk assessments.

Radiological risk calculations were performed using both the RESRAD/RESRAD-BASELINE computer models, developed by Argonne National Lab, and EPA's RAGS methodology for calculating the carcinogenic risk due to exposure to radioactive materials. Whenever possible, parameter values used by RESRAD were set equal to default values incorporated in the RAGS methodology. The largest pathway discrepancy between the two methodologies was the risk from produce ingestion, with the RESRAD risk exceeding the RAGS risk by an order of magnitude in some cases. Overall, the results of both analyses were compared and found to be extremely consistent.

More specific information concerning public health risks, including a quantitative evaluation of the degree of risk associated with various exposure pathways, is presented in the EPA's baseline human health risk assessment report for OU 1, contained in Volume I of the RI Report, and OU 2, contained in Volume II of the FS report.

Based on the results of the baseline risk assessment, EPA has determined that actual or threatened releases of hazardous substances from the Site, if not addressed by the preferred alternative or one of the other active measures considered, may present a current or potential threat to human health and the environment.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives (RAOs) are specific goals to protect human health and the environment. These objectives are based on available information and standards, such as applicable or relevant and appropriate requirements (ARARs), NYSDEC's recommended soil cleanup objectives, Site-specific risk-based levels, and the most reasonably anticipated future land use for the Site, i.e., commercial development. The RAOs which were developed for soil, sediment, and groundwater are designed, in part, to mitigate the health threat posed by ingestion, dermal contact, or inhalation of particulates where these soils are contacted or disturbed. The RAOs are also intended to mitigate the health threat posed by the ingestion of groundwater and are designed to prevent further leaching of contaminants from the soil to the groundwater.

The following remedial action objectives were established for the Site:

Building Materials

- Prevent exposure to building materials contaminated with radionuclides or chemicals of concern.

- Eliminate hazards to future Site workers posed by unstable structures.

- Remove any structural impediments that might interfere with pre-design sampling and implementation of soil and groundwater remediation.

Soil/Sediment

- Prevent or minimize exposure to contaminants of concern through inhalation, direct contact or ingestion.

- Prevent or minimize cross-media impacts from contaminants of concern in soil/sediments migrating into underlying groundwater (note that contamination of Glen Cove Creek's sediments has been addressed as part of the Mattiace Record of Decision for OU 1, and is therefore not included in the remedial objectives of this Plan).

Groundwater/Ponded Water

- Prevent or minimize ingestion, dermal contact and inhalation of inorganic-contaminated groundwater "hot spot" areas on lower Parcel C and on Parcel A that are above State and Federal MCLs (Note: organic contamination of groundwater from the Crown Dykman State Superfund Site will be addressed by the NYSDEC and is therefore not included in the remedial objectives of this Plan).

- Restoration of groundwater quality to levels which meet State and Federal standards.

- Remediation of contaminated surface water in on-Site ponds to reduce risks to public health and the environment.

In order to meet these objectives, preliminary remedial goals, or PRGs, were developed during the FS for various contaminants of concern. In developing the final soil cleanup numbers presented below, consideration was given to risks posed by the contaminants under reasonably anticipated future uses of the Site, consistency with cleanup levels developed for the State Superfund cleanup at Captain's Cove, and the New York State TAGMs. Site-wide cleanup levels developed for metals and radionuclides are presented in **Table 15**; these contaminants are intended to be indicators for other co-located metals contaminants. Due to the spatial and vertical location of contaminants of concern, EPA believes that if the contaminated soils are remediated to the cleanup levels presented in **Table 15** for the indicator contaminants, then the remaining inorganic contaminants in soils will also be adequately addressed. In addition, total PCBs were found in significant concentrations only in the dumping area of Parcel B at the Li Tungsten facility; therefore, cleanup levels for PCBs in that area will be 1 mg/kg in the top two feet and 10 mg/kg below two feet, based on TAGMs. Cleanup levels for contaminated sediments will include arsenic at 6 mg/kg and lead at 31 mg/kg, based on New York State Sediment Criteria.

Groundwater cleanup levels for arsenic and radium are State and Federal MCLs, i.e., arsenic = 0.05 µg/l and ^{226}Ra + ^{228}Ra = 5 pCi/l.

SUMMARY OF REMEDIAL ALTERNATIVES

CERCLA requires that each selected remedy be protective of human health and the environment, be cost-effective, comply with other statutory laws, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. In addition, the statute includes a preference for the use of treatment as a principal element for the reduction of toxicity, mobility, or volume of the hazardous substances.

The Proposed Plan evaluates, in detail, both soil and groundwater alternatives for the Li Tungsten Site. The soil alternatives address both contaminated soil and sediments. Soil alternatives evaluated in the Plan for the Captain's Cove property address the two areas of ore residuals disposal, since the other areas of this property with only nonradioactive contamination have been addressed under NYSDEC's March 1999 ROD. Similarly, alternatives for groundwater remediation were not evaluated for the Captain's Cove property because radionuclides slightly exceeded remediation goals in only one of eleven wells. The soil and groundwater alternatives for the Site are presented below.

The construction time for each alternative reflects only the time required to construct or implement the remedy and not the time required to design the remedy, negotiate its performance by the parties responsible for the contamination, or procure contracts for design and construction.

Because of the lengthy half-lives of the radionuclides of concern, e.g., both U^{238} and Th^{232} have half-lives exceeding one billion years, as well as Long Island's sole source aquifer designation, alternatives that would not permanently remove wastes containing the thorium and the uranium series radionuclides from the Site to protect future generations were considered not protective, nor were they felt to meet the criteria included in the Nuclear Regulatory Commission regulations in 10 CFR 40 regarding the siting of permanent radioactive waste disposal areas. Similarly, the consolidation and on-Site containment of radioactive wastes would not comply with the Long Island Landfill Law (NYS Environmental Conservation Law 27-0704), 6 NYCRR Part 380 etc. Thus, in developing the alternatives for soil remediation, on-Site containment of radioactive wastes was not included as an alternative.

Soil Remediation Alternatives - Li Tungsten Facility

Alternative LS - 1: No Action

Capital Cost:	$0
Annual Operation and Maintenance (O&M) Cost:	N/A
Construction Time:	N/A
30-Year Present Worth:	N/A

The Superfund program requires that the "No-Action" Alternative be considered as a baseline for comparison with the other alternatives. The No-Action Alternative includes no remedial measures to address the contamination at the Site.

The No-Action Alternative would include the development and implementation of a public awareness and education program for the residents in the area surrounding the Site. This program would include the preparation and distribution of informational press releases and circulars and convening public meetings. These activities would serve to enhance the public's knowledge of the conditions existing at the Site.

Because this alternative would result in contaminants remaining on-Site above health-based levels, CERCLA would require that the Site be reviewed every five years.

Alternative LS - 2: Excavation and Off-Site Disposal of Radioactive and Nonradioactive Metals-Contaminated Soils

Capital Cost:	$16,754,000
Annual O&M Cost:	$0
Construction Time:	5 months
30-Year Present Worth:	N/A

Under this alternative, approximately 27,000 cubic yards (cy) of soil, sediment, and ore and other metals-processing residuals (including those radioactive ore residuals presently staged in the

Dickson Warehouse) would be addressed. Soils, sediments, and ore and other metals-processing residuals contaminated above cleanup levels would be excavated in the various contaminated areas of the Li Tungsten facility. Radioactive wastes would require excavation to an average depth of four feet (maximum depth of four to six feet on Parcel C). Heavy metals-contaminated soils, while typically co-located with the radioactive materials, would require excavation to depths greater than four feet in several areas, because of a greater propensity of these metals to leach from the ore and other metals-processing residuals into the groundwater. Excavations to depths as much as ten feet would be required in a few areas of Parcel C in order to achieve the soil cleanup levels listed earlier under **REMEDIAL ACTION OBJECTIVES.**

Radioactive wastes would be disposed of at an off-Site disposal facility licensed to manage this type of material. Any nonradioactive, inorganic-contaminated wastes would be disposed of at an appropriate off-site landfill. If necessary, these excavated wastes would be chemically stabilized at the disposal facility to achieve compliance with the land ban requirements of the Federal Resource Conservation and Recovery Act (RCRA), due to the presence of inorganic contamination.

The existing storm sewers would be pressure-washed and the washwater and sediments collected for off-Site disposal.

Additionally, several structures would be demolished to eliminate hazards posed by structural instability and hazardous construction materials (i.e., asbestos), or in order to facilitate pre-design sampling and removal of radioactive and chemical wastes. This action would include, at a minimum, demolition of the Dickson Warehouse on Parcel C and the Carbide Building and Lab and Wire Building on Parcel A.

EPA would also recommend that deed restrictions be placed on the Li Tungsten facility property to prevent the property from being used for residential purposes, and to discourage the installation of potable water wells. Five-year reviews would be required as this alternative does not allow for unrestricted future use of the property.

Alternative LS - 3: Excavation with Radioactive Waste Volume Reduction, Off-Site Radioactive Waste Disposal and Stabilization and On-Site Containment of Other Nonradioactive Metals-Contaminated Soils

Capital Cost:	$12,579,000
Annual O&M Cost:	$60,000
Construction Time:	13 months
30-Year Present Worth:	$14,379,000

This alternative is different from Alternative LS-2 in that a radioactive materials separation technology or strategy would be used to reduce the volume of radioactive wastes after excavation in order to reduce the costs of off-Site disposal. Nonradioactive soils contaminated with inorganics would be stabilized and contained on-Site.

Excavated soils, sediments, and ore and other metals-processing residuals would be addressed via a volume reduction technology or strategy, e.g., the Segmented Gate System, or SGS; the Automated Conveyor Monitoring System; or precision excavation techniques specifically applicable to excavation of radioactive materials. The concentrated radioactive wastes would be disposed of at an off-Site disposal facility licensed to manage this type of material. Some or all of the remaining nonradioactive materials are expected to contain other hazardous substances such as heavy metals. The remaining material would be disposed of on-Site in a prepared cell after chemical fixation. The cell would likely be located in the middle of Parcel B of the Li Tungsten facility. The success of these efforts is dependent on the effectiveness of soil separation testing which would be conducted during the remedial design. For costing purposes, the volume reduction efficiency was considered to be 50 percent.

Alternative LS - 4: Excavation with Radioactive Waste Volume Reduction, Off-Site Radioactive Waste Disposal, and Off-Site Disposal of Other Nonradioactive Metals-Contaminated Soils

Capital Cost:	$14,445,000
Annual O&M Cost:	$0
Construction Time:	9 months
30-Year Present Worth:	N/A

This alternative is the same as Alternative LS-3, except that after utilization of a radioactive materials separation technology or strategy, any nonradioactive but metals-contaminated waste soils would be shipped off-Site for disposal instead of being contained on-Site. These wastes would be disposed of at an off-Site Subtitle D facility, unless they were determined to be hazardous pursuant to RCRA in which case they would be disposed of at an off-Site RCRA Subtitle C facility.

Soil Remediation Alternatives - Captain's Cove Property

Alternative CS - 1: No Action

Capital Cost:	$0
Annual O&M Cost:	N/A
Construction Time:	N/A
30-Year Present Worth:	N/A

The Superfund program requires that the "No-Action" Alternative be considered as a baseline for comparison with the other alternatives. The No-Action Alternative does not include any remedial measures that address the problem of contamination at the Site.

The No-Action Alternative would include the development and implementation of a public awareness and education program for the residents in the area surrounding the Site. This program would include the preparation and distribution of informational press releases and circulars and convening public meetings. These activities would serve to enhance the public's knowledge of the conditions existing at the Site.

Because this alternative would result in contaminants remaining on-Site above health-based levels, CERCLA would require that the Site be reviewed every five years.

Alternative CS - 2: Excavation and Off-Site Disposal of Radioactive and Nonradioactive Metals-Contaminated Soils

Capital Cost:	$15,465,000
Annual O&M Cost:	$0
Construction Time:	3 months
30-Year Present Worth:	N/A

This alternative is similar to Alternative LS-2 for the Li Tungsten facility. Approximately 31,000 cubic yards of soil, sediment, and ore and other metals-processing residuals contaminated above radioactive cleanup levels would be excavated in Areas A and G of the Captain's Cove property.

Radioactive wastes would be disposed of at an off-Site disposal facility licensed to manage this type of material. Any nonradioactive, heavy metals-contaminated soils would be disposed of at an appropriate off-Site landfill. If necessary, excavated waste would be chemically fixated at the disposal facility to achieve land ban compliance, due to the presence of inorganic contamination.

EPA would also recommend that deed restrictions be placed on the Captain's Cove property both to prevent it from being used for residential purposes and to discourage the installation of potable water wells. Five-year reviews would be required as this alternative does not allow for unrestricted future use of the property.

Alternative CS - 3: Excavation with Radioactive Waste Volume Reduction, Off-Site Radioactive Waste Disposal, and Stabilization

and On-Site Containment of Other Nonradioactive Metals-Contaminated Soils at the Li Tungsten Facility

Capital Cost:	$10,432,000
Annual O&M Cost:	$60,000
Construction Time:	11 months
30-Year Present Worth:	$11,787,000

This alternative is different from Alternative CS-2 in that a radioactive materials separation technology or strategy would be used to further reduce the volume of radioactive wastes after excavation in order to reduce the costs of off-Site disposal, and on-Site stabilization and containment would be utilized for disposal of nonradioactive, but metals-contaminated wastes.

Excavated soils and ore and other metals-processing residuals would be addressed via a volume reduction technology or strategy. The concentrated radioactive wastes would be disposed of at an off-Site disposal facility licensed to manage this type of material. Some or all of the remaining nonradioactive material is anticipated to contain other hazardous substances, such as heavy metals. The remaining material would be disposed of on-Site in a prepared cell after chemical fixation. The cell would likely be located in the middle of Parcel B of the Li Tungsten facility. The success of these efforts is dependent on the effectiveness of soil separation testing which would be conducted during the remedial design. For costing purposes, the volume reduction efficiency was considered to be 50 percent.

Alternative CS - 4: Excavation with Radioactive Waste Volume Reduction, Off-Site Radioactive Waste Disposal, and Off-Site Disposal of Other Nonradioactive Metals-Contaminated Soils

Capital Cost:	$13,597,000
Annual O&M Cost:	$0
Construction Time:	7 months
30-Year Present Worth:	N/A

This alternative is the same as Alternative CS-3, except that after utilization of a radioactive materials separation technology or strategy, any nonradioactive but metals-contaminated wastes would be shipped off-Site for disposal instead of being contained on-Site. These wastes would be disposed of at an off-Site Subtitle D facility, unless they were determined to be hazardous pursuant to RCRA, in which case they would be disposed of at an off-Site RCRA Subtitle C facility.

Groundwater Remediation Alternatives

Alternative LW - 1: No Action

Capital Cost:	$0
Annual O&M Cost:	$32,000
Construction Time:	N/A
30-Year Present Worth:	$722,000

The Superfund program requires that the "No-Action" Alternative be considered as a baseline for comparison with the other alternatives. The No-Action Alternative does not include any remedial measures that address the contamination at the Site.

This alternative would serve as a groundwater monitoring mechanism for the Li Tungsten Site. A long-term sampling program would be developed to monitor groundwater quality. New monitoring wells would also be added to the existing monitoring well networks to increase the network's coverage in areas of known contamination.

Because this alternative would result in contaminants remaining on-Site above health-based levels, CERCLA would require that the Site be reviewed every five years.

Alternative LW - 2: Interceptor Trench/Extraction Wells with On-Site Treatment and Disposal

Capital Cost:	$351,000
Annual O&M Cost:	$84,000
Construction Time:	6 months
30-Year Present Worth:	$2,247,000

This alternative uses a combination of an interceptor trench and low-flow extraction wells to capture groundwater contaminated with heavy metals for on-Site treatment consisting of chemical precipitation/settling and on-Site reinjection to groundwater. To capture shallow inorganic contaminated groundwater (less than 20 feet bgl), an interceptor trench would be installed on the lower portion of Parcel C. The trench would measure approximately 350 feet long. Multi-tiered horizontal high density polyethylene perforated piping would be installed perpendicularly to the groundwater flow direction. Low-flow extraction wells would also be installed in inorganic "hot spot" areas to capture isolated pockets of groundwater contamination. Contaminated groundwater from the interceptor trench and wells would be collected and channeled via gravity flow to collection sump areas. Contaminated groundwater at the sump areas would be pumped at approximately 10 gallons per minute to an on-Site treatment facility where it would be treated to State and Federal MCLs and groundwater standards through chemical precipitation, clarification, and pH adjustment.

The treated groundwater would then be conveyed to up gradient on-Site reinjection galleries.

A long-term sampling program would be developed to monitor groundwater quality. New monitoring wells would be added to the existing monitoring well network to increase its area of coverage.

Alternative LW - 3: Interceptor Trench/Extraction Wells with Off-Site Treatment and Reinjection at the Nearby Mattiace Superfund Site Treatment Facility

Capital Cost:	$208,000
Annual O&M Cost:	$47,000
Construction Time:	6 months
30-Year Present Worth:	$1,269,000

This alternative is similar to Alternative LW-2 in that it would use an interceptor trench and low-flow extraction wells to capture contaminated groundwater. Instead of on-Site treatment, however, the contaminated groundwater would be conveyed via an underground pumping station and force main from the Li Tungsten facility to the Mattiace Site’s groundwater treatment plant. The flow from the Li Tungsten facility (estimated at approximately 10 gallons per minute), when combined with flow from the Mattiace extraction wells, would be approximately 20 gallons per minute. Treatment would consist of chemical precipitation, clarification, and pH adjustment. Some modifications to the existing Mattiace plant and/or operating procedures might be necessary to accept the waste stream from the Li Tungsten facility. For example, because the Li Tungsten waste influent is predominantly heavy metals, an additional metals clarifier might have to be added. Chemical feed rates for metals treatment would also change and the amount of sludge generated by the facility would increase, requiring more frequent sludge hauling.

A long-term sampling program would be developed to monitor groundwater quality. New monitoring wells would be added to the existing monitoring well network to increase its area of coverage.

Alternative LW - 4: Reactive Walls with Slurry Walls and In-Well Adsorption Treatment

Capital Cost:	$644,000
Annual O&M Cost:	$29,000
Construction Time:	7 months
30-Year Present Worth:	$1,299,000

This alternative consists of the installation of a reactive wall on lower Parcel C, directly down gradient of the existing inorganic contamination. The reactive wall would be installed below-ground to a depth of approximately 30 feet bgl. It would be designed as a funnel and gate system and would consist of a passive permeable barrier through which groundwater would pass. The funnel, consisting of a soil-bentonite slurry wall, would be designed to channel contaminated groundwater toward the treatment gates, which would contain adsorption media to capture the inorganic contamination. Collection galleries consisting of pea gravel would be installed adjacent to the wall. Treated groundwater would then flow to a distribution trench, located immediately down gradient of the slurry wall.

"Hot spot" inorganic contamination areas would be treated via in-well adsorption using media that selectively adsorbs dissolved heavy metals. The media would be periodically retrieved and disposed of while new media was reinserted for additional cycles of adsorption.

A long-term sampling program would be developed to monitor groundwater quality. New monitoring wells would be added to the existing monitoring well network to increase the network's area of coverage.

EVALUATION OF ALTERNATIVES

During the detailed evaluation of remedial alternatives, each alternative is assessed against nine evaluation criteria. These nine criteria are as follows: overall protection of human health and the environment; compliance with applicable or relevant and appropriate requirements; long-term effectiveness and permanence; reduction of toxicity, mobility, and volume through treatment; short-term effectiveness; implementability; cost; and State and community acceptance. The evaluation criteria are described below.

- <u>Overall protection of human health and the environment</u> addresses whether or not a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

- <u>Compliance with applicable or relevant and appropriate requirements (ARARs)</u> addresses whether or not a remedy would meet all of the applicable or relevant and appropriate requirements of other Federal and State environmental statutes and requirements, or provide grounds for invoking a waiver.

- Long-term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met. This criteria also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.

- Reduction of toxicity, mobility, or volume through treatment is the anticipated performance of the treatment technologies, with respect to these parameters, a remedy may employ.

- Short-term effectiveness addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

- Implementability is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

- Cost includes estimated capital and operation and maintenance (O&M) costs, and net present worth costs.

- State acceptance indicates whether, based on its review of the RI/FS and Proposed Plan, the State concurs with, opposes, or has no comment on the preferred remedy.

- Community acceptance will be assessed in the ROD and refers to the public's general response to the alternatives described in the Proposed Plan and the RI/FS reports.

Comparative Analysis of Soil Remedial Alternatives

Overall Protection of Human Health and the Environment

Alternatives LS-1 and CS-1, the No-Action Alternatives, would not protect human health or the environment beyond discouraging entry to the presently fenced Site.

All remaining soil alternatives would protect human health and the environment by reducing the existing exposures to radiological and chemical Site contaminants to below soil/sediment cleanup levels. Alternatives LS-2 and CS-2 and Alternatives LS-4 and CS-4 would achieve protection of human health and the environment by removing the contaminated soils, sediments, and ore and other metals-processing residues above cleanup levels for off-Site treatment and disposal. Alternatives LS-3 and CS-3 would achieve similar protection vis-a-vis the radionuclides of concern by removing them off-Site. These alternatives would achieve protectiveness from the heavy metal contaminants by stabilizing and containing them on-

Site, thereby reducing or eliminating the various exposure pathways and potential for cross-media impacts to groundwater that presently exist.

Compliance with ARARs

Alternatives LS-2 and CS-2, and LS-4 and CS-4 may have to comply with land disposal restrictions (or LDR, codified at 40 C.F.R. § 268) for the off-Site disposal of any excavated wastes contaminated with certain heavy metals above LDR levels. This ARAR also describes minimum technology requirements needed to construct the on-Site cell in Alternative LS-3 and CS-3. The construction of the containment cell in Alternative LS-3 and CS-3 would be subject to 6 NYCRR Parts 360 and 364 which outline requirements of solid and hazardous waste management facilities and transporters for managing radioactive and hazardous materials. Off-Site transportation of radioactive materials under Alternatives LS-2 and CS-2, LS-3 and CS-3, and LS-4 and CS-4 which exceed a concentration of 2,000 pCi/g would be regulated by 49 C.F.R. § 173. Since Alternatives LS-2 and CS-2, LS-3 and CS-3, and LS-4 and CS-4 would involve the excavation of some PCB-contaminated soils, disposition of the PCB waste would be governed by the requirements of the Federal Toxic Substances Control Act (TSCA).

During excavation activities, the radionuclide emissions standards of 40 C.F.R. § 61 which limits exposures to the maximally exposed member of the public to 10 mrem/year must be met.

For a complete listing of ARARs, see Tables 2-6, 2-7 and 2-8 of the Li Tungsten FS, Volume 1.

Long-Term Effectiveness and Permanence

Alternatives LS-1 and CS-1 would not provide any long-term effectiveness or permanence in protecting human health and the environment.

All of the other soil alternatives would permanently protect public health and the environment over the long term because the radioactive wastes would be excavated and removed to an off-Site facility licensed to manage this type of material. Implementation of Alternatives LS-2 and CS-2 and Alternatives LS-4 and CS-4 would ensure permanent protection of public health and the environment at the Site over the long term because the nonradioactive, metals-contaminated soils at the Site would be removed to an off-Site disposal location designed for long-term containment. Alternatives LS-3 and CS-3 would provide for long-term effectiveness and permanence through a properly designed on-Site containment cell which in turn would require institutional controls and extended maintenance to provide long-term protection to public health and the environment.

Reduction of Toxicity, Mobility, or Volume through Treatment

Alternatives LS-1 and CS-1 would not reduce the toxicity, mobility, or volume of any contaminants at the Site. Alternatives LS-2 and CS-2 and Alternatives LS-4 and CS-4 would reduce the toxicity, mobility, and volume of contaminants at the Site through excavation and off-Site disposal of the radioactive and metals-contaminated wastes. Alternatives LS-3 and CS-3 would reduce the toxicity, mobility, and volume of the radiological contaminants in the same manner. Alternatives LS-3 and CS-3 would reduce the toxicity and mobility of the heavy metals-contaminated soils that would be contained on-Site by chemically fixating the metals to prevent them from leaching. Alternatives LS-3 and CS-3 and Alternatives LS-4 and CS-4 may reduce the volume of the radioactive materials through the use of a separation technology; however, the percent volume reduction is uncertain and would be the result of a physical separation process rather than a result of treatment.

Short-Term Effectiveness

The No-Action Alternatives LS-1 and CS-1 would not result in any adverse short-term impacts. Potential short-term impacts would be associated with Alternatives LS-2 and CS-2, LS-3 and CS-3, and LS-4 and CS-4 due to the direct contact with soil by workers and through the potential for generation of dust during construction. Such impacts would be minimized through worker health and safety protective measures and dust suppression techniques such as covering waste piles and water spraying during dust-generating activities. Monitoring the excavation and soil handling areas to determine emission levels will also ensure that off-Site receptors were not being significantly impacted. Alternatives LS-3 and CS-3 and Alternatives LS-4 and CS-4 would involve additional handling during on-Site radioactive materials separation, and Alternatives LS-3 and CS-3 would also result in increased handling of materials during stabilization of the metals-contaminated wastes and their disposition in the on-Site cell. The vehicular traffic associated with all Alternatives other than No Action could impact the local roadway system and nearby residents through increased noise level and traffic flow.

Proper protective equipment, air monitoring during excavation and soil handling, and appropriate soil handling procedures would minimize the short-term risks to workers and the surrounding community for all the alternatives, other than the No Action Alternatives.

Implementability

The implementability of Alternatives LS-2 and CS-2, LS-3 and CS-3, and LS-4 and CS-4 would likely be a function of the acceptability of transportation of low-level radioactive wastes to an off-Site disposal location. These wastes would be securely loaded and trucked to an appropriate rail spur, where the wastes would then be shipped by rail to their ultimate disposal location. The implementability of Alternatives LS-3 and CS-3 and Alternatives LS-4 and CS-4 would also depend on the efficiency of the separation technology or strategy selected for separation of radionuclide-contaminated soil from other excavated soils. The implementability of Alternatives LS-3 and CS-3, in which heavy metals-contaminated soil would be left on-Site in a containment cell above health-based levels, would depend on receiving State approval and local acceptance. Institutional controls through deed restrictions on the future residential development of the Li Tungsten facility and Captain's Cove property should be readily implementable for all the Alternatives.

Cost

Table 16 provides the capital costs, operation and maintenance costs, and present worth costs associated with each of the combined Soil Alternatives. Present worth costs were calculated over a 30 year period using 1999 as the base year, 5% as the discount rate, and 3% as the rate of inflation. The three sets of Soil Alternatives other than the No Action Alternative are relatively similar in their present worth estimates. Capital cost outlays would be significantly less expensive, though, for LS-3/CS-3 than for LS-2/CS-2 or LS-4/CS-4.

State Acceptance

NYSDEC concurs with the selected remedy, **Excavation with Radioactive Waste Volume Reduction, and Off-Site Disposal of Radioactive and Nonradioactive Metals-Contaminated Soils (LS-4/CS-4), and No Action with continued groundwater monitoring (LW-1).** A letter of concurrence is attached as **Appendix IV.**

Community Acceptance

Community acceptance of the selected remedy for soil was assessed during the public comment period. Comments were expressed at the public meeting and written comments were received during the public comment period. While the public seemed generally supportive of the remedy at the public meeting, over 700 identical (form) letters were received asking EPA, to change the proposed alternatives for soil remediation from Alternatives LS-4 and CS-4 (which include soil separation to reduce the volume of radiologically-contaminated soil) to Alternatives LS-2 and CS-2 (which do not include volume reduction). The letters also requested that EPA take adequate preventive measures to control fugitive dust, establish radioactive air monitoring stations during cleanup activities and conduct further risk assessment analyses. Specific responses to public comments are addressed in the Responsiveness Summary, which is attached as **Appendix V.**

Comparative Analysis of Groundwater Remedial Alternatives

Overall Protection of Human Health and the Environment

The remedial action objective of the Groundwater Alternatives is to eventually restore groundwater quality in order to meet State and Federal MCLs. However, even without deed restrictions or other institutional controls, the human health impacts from potable water consumption that were calculated in the risk assessment represent a hypothetical risk. The likelihood of drawing potable water from the Upper Glacial Aquifer is very remote because of the high level of dissolved solids in the aquifer from saltwater intrusion from Glen Cove Creek and Hempstead Harbor, as well as the ready availability of the City public water supply. Alternative LW-1, the No-Action Alternative, would not in itself provide any protection of human health and the environment as no active remedial measures or institutional controls are included in this alternative. However, remediation of contaminated soil should greatly decrease the degree of leaching of contaminants from the soil into the groundwater, which in turn would significantly reduce the magnitude and duration of any hypothetical future impacts on human health and the environment from groundwater. Alternatives LW-2, LW-3, and LW-4 would directly provide protection of human health and the environment because the groundwater contaminated with inorganics at the Li Tungsten facility would be gradually intercepted and prevented from discharging to Glen Cove Creek.

Compliance with ARARs

Alternative LW-1 would not actively address the concentrations of arsenic, antimony, and other heavy metals in groundwater that are presently in excess of MCLs promulgated under the Federal Safe Drinking Water Act (40 C.F.R. § 141), the New York State MCLs (10 NYCRR Part 5), or New York State Water Quality Standards (6 NYCRR Part 703). However, it is anticipated that soils remediation could result in MCLs being achieved in the near future by removing the source of groundwater contamination.

Alternatives LW-2, LW-3, and LW-4 all use treatment technologies capable of removing the inorganics of concern to meet the standards.

Off-Site disposal of any sludges or treatment residues generated as a result of groundwater treatment processes included as part of Alternatives LW-2, LW-3, and LW-4 would be required to be sent to an appropriate off-Site treatment/disposal facility.

Long-Term Effectiveness and Permanence

Removal of the source of groundwater contamination under any of the soil alternatives would improve the long-term effectiveness and permanence of all of the groundwater alternatives.

Contaminants would not be actively removed under Alternative LW-1 except by the natural movement of groundwater. The natural movement of groundwater would dilute the remaining contaminated levels and eventually flush the inorganics into Glen Cove Creek, where they would continue to be dispersed. Given the relatively sporadic inorganic contamination that currently exists in the Upper Glacial Aquifer, it is anticipated that this mechanism when combined with the soil remediation would provide long-term effectiveness in meeting groundwater standards. The monitoring program would be designed to determine if LW-1 is effective.

Alternatives LW-2, LW-3, and LW-4 would all be similarly effective over the long term in permanently removing inorganic contaminants from groundwater.

Reduction of Toxicity, Mobility, or Volume through Treatment

Alternative LW-1 would not reduce the toxicity, mobility, or volume of contaminated groundwater through treatment. Using different technologies, Alternatives LW-2 and LW-3 would reduce the toxicity, mobility, and volume of contaminated groundwater through chemical precipitation of heavy metals, clarification, and pH adjustment. Alternative LW-4 would rely on an adsorptive treatment media to adsorb dissolved heavy metals for subsequent off-Site disposal.

Short-Term Effectiveness

Alternative LW-1 would not include any remediation and therefore would not pose any short-term impacts to the community or to workers.

Alternatives LW-2, LW-3, and LW-4 would all require trenching in the vicinity of Garvies Point Road and Herbhill Road to accommodate the installation of different subsurface features (i.e., wells, drains, force main, and slurry wall). Potential short-term impacts would be associated with the direct contact with soil by workers and the potential for generation of dust during construction. Such impacts would be minimized through worker health and safety protective measures and dust suppression techniques such as covering waste piles and water spraying during dust-generating activities.

Alternative LW-3 would have the most impact on the local community as it would require that a forcemain be installed below grade for approximately 700 feet from the groundwater collection point to the treatment facility at the Mattiace Site.

Potential short-term impacts would be associated with the three treatment alternatives as a result of the direct contact of groundwater by workers. However, impacts would be minimized through worker health and safety protective measures.

Implementability

All of the alternatives are considered technically and administratively implementable. Alternatives LW-2, LW-3, and LW-4 all would be able to achieve MCLs in the treated effluent with the proposed treatment methods, although the reliance of LW-2 and LW-3 on standard proven technology improves their degree of implementability. Off-Site property easements or construction permits should also be relatively easy to obtain for all three action alternatives.

Cost

Table 17 provides the capital costs, operation and maintenance costs, and present worth costs associated with each of the groundwater alternatives. Present worth costs were calculated over a 30 year period using 1999 as the base year, 5% as the discount rate, and 3% as the rate of inflation. LW-4 has the highest capital cost outlay, being three times as expensive as the least expensive action alternative, LW-3. LW-2 has the highest present worth costs, due to the relatively high maintenance costs of operating a treatment facility. LW-1 predictably costs the least in a present worth analysis, because the only costs associated with this alternative are for the long-term monitoring program.

State Acceptance

As mentioned above, NYSDEC concurs with the selected remedy, **Excavation with Radioactive Waste Volume Reduction, and Off-Site Disposal of Radioactive and Nonradioactive Metals-Contaminated Soils (LS-4/CS-4), and No Action with Continued Groundwater Monitoring (LW-1)**. A letter of concurrence is attached as **Appendix IV**.

Community Acceptance

Community acceptance of the selected remedy for groundwater was assessed during the public comment period. EPA believes that the community generally supports this approach. Specific responses to public comments are addressed in the Responsiveness Summary, which is attached as **Appendix V.**

SELECTED REMEDY

<u>Soils, Sediments, and Debris</u>

Based upon an evaluation of the various alternatives and consideration of community acceptance, EPA and NYSDEC have selected **Alternative LS-4 and CS-4: Excavation with Radioactive Waste Volume Reduction, and Off-Site Disposal of Radioactive and Nonradioactive Metals-Contaminated Soils** for the contaminated soils, sediments, and debris at the Li Tungsten facility and the Captain's Cove property. The selected remedy at both Li Tungsten and Captain's Cove will include excavation, volume reduction, and off-Site disposal of all radioactive/chemical wastes, consistent with the cleanup levels developed for this Site. The remedial action cleanup levels for these wastes were provided earlier in **Table 15.**

There are multiple areas requiring excavation on all three parcels of the Li Tungsten facility (**Figure 6**) and there are two large areas requiring excavation at Captain's Cove (**Figure 7**). At the Li Tungsten facility, radioactive wastes require excavation to an average depth of four feet (estimated depth of six feet, on Parcel C). Heavy metals-contaminated soils, while typically co-located with the radioactive wastes, will require excavation to depths greater than four feet in several areas, because of the elevated concentrations of heavy metals and the propensity of these metals to leach from the ore and other metals-processing residuals into the subsurface and eventually into the groundwater. Excavations to depths as much as ten feet will be required in a few areas of Parcel C in order to achieve the chemical cleanup levels for these metals-contaminated soils. Excavation is expected to yield an estimated 18,300 cy of radioactive wastes and 17,300 cy of nonradiactive metals-contaminated wastes at the Li Tungsten facility.

At Captain's Cove, where the radioactive wastes were buried deeper, wastes will require excavation to an average depth of eight feet in Area A, and twelve feet in Area G. Excavation is expected to yield an estimated 13,200 cy of radioactive wastes and 20,550 cy of nonradioactive, metals-contaminated wastes at the Captain's Cove property. Excavated Site wastes will be treated through a volume reduction technology or strategy in order to minimize the volume of the radioactive wastes that will require off-Site disposal at a disposal facility licensed to manage this type of material. Treatability tests will be required to determine the efficiency of any volume reduction technology employed. In the event that separation of radionuclide-contaminated soil from nonradionuclide soil contaminated with heavy metals cannot be accomplished in a cost-effective manner, the excavated soils will be disposed at appropriately licensed facilities as described in Alternatives LS-2 and CS-2 in the Decision Summary of this Record of Decision. Radioactive wastes will be disposed of at an off-Site disposal facility licensed to manage this type of material. Some or all of the remaining non-radioactive wastes are anticipated to contain other contaminants, such as heavy metals. These wastes will be disposed of at an off-Site RCRA Subtitle D facility, unless the toxicity characteristic leaching procedure (TCLP) testing indicates that they are hazardous, in which case they will be disposed of at a RCRA Subtitle C facility. Post-excavation sampling will be required to ensure that soil cleanup levels have been met prior to backfilling the holes. Excavated soils that do not exceed cleanup levels or contain debris could be used as backfill. In addition, a minimum of two feet of clean fill will then be used to complete the backfilling to match the surrounding grade.

The existing storm sewers will also be pressure-washed and the effluent and sediments collected for off-Site disposal.

The selected remedy will also include demolition of several structures at the Li Tungsten facility to eliminate hazards posed by structural instability, hazardous materials of construction (i.e., asbestos), or contamination with radionuclides, as well as to facilitate both pre-design sampling and implementation of future remedial actions. This action will include, at a minimum, demolition of the Dickson Warehouse on Parcel C and the Carbide and Lab and Wire Buildings on Parcel A.

Groundwater and Surface Water

Based upon an evaluation of the various alternatives and consideration of community acceptance, EPA and NYSDEC have selected **Alternative LW-1: No Action** for contaminated groundwater at the Li Tungsten facility.

The preferred alternative at the Li Tungsten facility will require monitoring of the Upper Glacial Aquifer in the vicinity of the Site to determine the effects of the soil remedy on groundwater quality. The preference for no action is based on the sporadic and generally low-level nature of the inorganic contamination; as well as the impacts of saltwater intrusion on the Aquifer and the availability of the City's potable water supply to the affected area, which significantly contribute to the non-use of the contaminated aquifer as a potable water source. Nassau County Public Health Ordinance Article 4, which prohibits the installation of new private potable water systems in areas served by a public water supply, should effectively preclude any future potable water well installations in this portion of the aquifer. The excavation of inorganic contamination to the specified cleanup levels will also minimize leaching of the contaminants in the soil to groundwater. As a result, the groundwater beneath the Site is expected to improve after excavation is completed.

As noted above, a groundwater monitoring program will be initiated as part of the selected remedy to monitor the quality of the aquifer beneath the Site. Additional monitoring wells will be added to the existing monitoring well network to increase the network's coverage in areas of known contamination. Monitoring of the sediments and water column of Glen Cove Creek will also continue on an annual basis as part of the Mattiace Superfund long-term response action. The results of both monitoring programs will be integrated to provide a comprehensive analysis of the contaminant profile in groundwater and in the Creek, and to identify any discernible interrelationships or trends. As noted in the discussion on Glen Cove Creek under the Summary of Site Characteristics section, approximately 12,000 cy of sediment were dredged from the mouth of the Creek in 1996; sampling results from monitoring location GC-03, located in this dredged area, indicate significantly lower contaminant levels than previous results for this area. In addition, the planned dredging of the remainder of the Creek this Fall/Winter, which will include dredging of the entire width of the Creek fronting virtually all of Parcel A to a depth of 8 feet, will result in the removal of approximately 35,000 cy of sediment. This sediment removal coupled with EPA and DEC remedial actions planned for the Li Tungsten facility and Captain's Cove, as well as other actions planned or underway for other Federal or State sites, should result in significant improvement in the water quality and sediment quality in the Creek. The year 2000 monitoring event should provide valuable information regarding potential beneficial impacts of the Army Corp dredging effort; EPA and DEC will consider whether additional sampling locations should be added for this effort. In addition, the year 2000 monitoring results should be utilized by EPA and DEC to evaluate whether the monitoring program should be expanded to include ecological monitoring or toxicity testing. At that time, the EPA and the NYSDEC will consider whether the scope of the monitoring program needs to be modified.

To complete the proposed remedial action, EPA recommends that deed restrictions be placed on the Li Tungsten Site, primarily to prevent the Site from being used for residential purposes. The deed restriction will also include controls to ensure the protection of public health through restrictions on groundwater withdrawals for any purpose that could lead to human exposure e.g., drinking water, irrigation, fountains, etc. until the groundwater beneath the Site has reached cleanup levels; as well as requiring that any new construction on this Site should adhere to relevant building codes for radon/thoron gases.

During implementation of the selected remedy, best management practices at the Site will also include 1) decommissioning industrial water supply well N1917 on Parcel A, which is screened 311 bgl in the Lloyd Aquifer, in order to prevent any potential transmission of contaminants from the Upper Glacial Aquifer, and 2) draining surface water in ponds on Parcels B and C, concurrent with the excavation of contaminated sediments. Five- year reviews of the Site will also be conducted to ensure the protectiveness of the remedy.

The selected remedy will result in an effective, long-term permanent remedy because all soils with radioactivity greater than the radionuclide cleanup levels will be disposed of at a licensed radiological waste disposal facility. Implementation of the selected remedy will allow redevelopment of the Li Tungsten Superfund Site in substantial conformance with the City of Glen Cove's Revitalization Plan. The accelerated placement of these properties back into a commercially-viable scenario will also meet the primary objective of EPA's "Recycling Superfund Sites" initiative.

EPA and NYSDEC will attempt to expedite the implementation of the soil remedy for the southern portion of the Li Tungsten facility, encompassing Parcel A, lower Parcel B and lower Parcel C. The estimated volume of soil targeted for excavation in these areas is approximately 5,000-6,000 cy, a disproportionately small volume of the facility's contaminated soils. Fast tracking this portion of the remediation would allow for the accelerated placement of this portion of the property back into a commercially viable scenario. This potential action would not only facilitate the City's revitalization of the Creek area, it would also be consistent with EPA's "Recycling Superfund Sites" initiative.

The selected remedy will provide the best balance of trade-offs among alternatives with respect to the evaluating criteria. EPA and NYSDEC believe that the selected remedy will be protective of human health and the environment, comply with ARARs, be cost-effective, and utilize permanent solutions to the maximum extent practicable, as discussed below.

STATUTORY DETERMINATIONS

Under its legal authorities, EPA's primary responsibility at Superfund sites is to undertake remedial actions that are protective of human health and the environment. In addition, Section 121 of CERCLA establishes several other statutory requirements and preferences. These specify that when complete the selected remedial action for this Site must comply with applicable, or relevant and appropriate environmental standards established under Federal and State environmental laws unless a waiver from such standards is justified. The selected remedy also must be cost-effective and utilize permanent solutions and alternative treatment technologies or resource-recovery technologies to the maximum extent practicable. Finally, the statute includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity, or mobility of hazardous substances, as available. The following sections discuss how the selected remedy meets these statutory requirements.

Protection of Human Health and the Environment

The selected remedy is protective of human health and the environment. The selected cleanup levels for soil include 5 parameters from 3 categories, i.e., radionuclides, non-radionuclide heavy metals, and PCBs, to ensure that the excavation removes the contaminants of concern at this Site, which tend to be co-located. Further, the numerical cleanup levels are sufficiently protective from the standpoint of carcinogenic and non-carcinogenic risk for all future on-Site populations except for residential use. Excavating contaminated soils and sediments above the selected cleanup levels and disposing of them off-Site will greatly reduce future human exposures and environmental impacts from the contaminated soils, as well as remove the source of inorganic groundwater contamination. Because the low levels of radionuclides and heavy metals that are left behind may still be technically above their respective regional background levels and above levels considered safe for residential occupation, institutional controls in the form of deed restrictions on residential future use of the properties will help protect human health by limiting the properties to commercial uses.

The selection of no-action for groundwater is considered protective of human health and the environment because of the very low level nature of the groundwater threat. There is virtual certainty that the groundwater in the Upper Glacial Aquifer will not be used for any purpose which could allow for human health or environmental impact. An additional institutional control in this case is provided by the Nassau County Department of Health Ordinance Article 4 which prohibits potable water wells in an area serviced by a municipal water supply. In addition, the remedy provides for decommissioning and hydraulically plugging Industrial Well N1917 on Parcel A, to eliminate a possible conduit for contamination of the deeper, more productive Lloyd Aquifer.

The long-term monitoring of the groundwater in the vicinity of the Site will assess the rate of recovery of the Upper Glacial Aquifer as the localized pockets of heavy metal contamination dissipate in the absence of a contaminant source. The concurrent monitoring of Glen Cove Creek will continue to assess the levels of heavy metals and other contaminants in the Creek during and after soil remedy implementation.

Compliance with ARARS

The National Contingency Plan, Section 300.430 (P)(ii)(B) requires that the selected remedy attain federal and state ARARs. The remedy will comply with the following action-, chemical- and location-specific ARARs identified for the Site and will be demonstrated through monitoring, as appropriate.

Action-Specific ARARs:

- 40 CFR Part 61 - National Emissions Standards for Hazardous Air Pollutants
- 40 CFR Part 254.25 - Excavation and Fugitive Dust Emissions
- 49 CFR 173 - Off-Site Transportation of Radioactive Materials

- 40 CFR Parts 260-268 - RCRA Standards for Handling, Transportation and Disposal of Hazardous Waste, including Land Disposal Restrictions

- 6 NYCRR Part 200.6 - Ambient Air Quality Standards

- 6 NYCRR Parts 370-373 - New York State Standards for Handling, Transportation and Disposal of Hazardous Waste

Chemical-Specific ARARs:

- 40 CFR Part 141 - Federal Safe Drinking Water Act Maximum Contaminant Levels (MCLs)

- 6 NYCRR Part 703 - New York Water Quality Standards

- 10 NYCRR Part 5 - New York State Sanitary Code for Drinking Water

Location-Specific ARARs:

- National Historic Preservation Act

- U.S. Coastal Zone Management Act

To-Be-Considered:

- Air Guide I - NYSDEC Control of Toxic Ambient Air Contaminants

- NYSDEC TAGMs 4003 and 4046 - Hazardous and Radioactive Materials Soil Cleanup Levels

- 40 CFR 192 - Uranium Mill Tailings Radiation Control Act (UMTRCA) Standards for Disposal and Control of Uranium and Thorium Mill Tailings

<u>Cost-Effectiveness</u>

Each of the alternatives has undergone a detailed cost analysis. In that analysis, capital costs and O&M costs have been estimated and used to develop present worth costs. In the present-worth cost analysis, annual costs were calculated for 30 years (estimated life of an alternative) using a five percent discount rate and a three percent rate of inflation, with 1999 as the base year. The selected remedy for soil, although it is somewhat more expensive than Alternative LS-3/CS-3, nevertheless was felt to provide correspondingly greater benefits in terms of permanent reductions in toxicity, mobility, and volumes of contaminants, as well as in implementability and community and State acceptance. The selected remedy for groundwater has associated costs for long-term monitoring only, and is therefore relatively inexpensive. The effectiveness of this part of the remedy derives from the removal of the contaminated soils, which should accelerate restoration of the Upper Glacial Aquifer, as well as the very low level of threat posed by the contaminated groundwater to human health and the environment at this Site. For costing purposes, the duration of the monitoring program was assumed to be 30 years; given the fact that the soil excavation will remove the source of the localized groundwater contamination, EPA anticipates that the duration of the monitoring program and its associated cost will be reduced significantly.

The selected remedy will achieve the goals of the response actions and is cost-effective because it will provide the best overall effectiveness in proportion to its cost. For a detailed breakdown of costs associated with the selected remedy, please see **Table 18.**

Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

The selected remedy utilizes a permanent solution to the soil contamination which has rendered the Site presently unusable. Implementing the selected remedy will allow the Site to be reused commercially. The City of Glen Cove currently has a final Revitalization Plan which includes commercial use of the properties that are the subject of the selected remedy. EPA believes that the selected remedy is compatible with the City's Revitalization Plan. The selected remedy represents the most appropriate solution to contamination in the soil and groundwater at the Site because it provides the best balance of trade-offs among the alternatives with respect to the nine evaluation criteria.

Alternative radionuclide separation technologies may be employed where effective to reduce the volume of radionuclide-contaminated soil for off-Site disposal. The actual technology utilized will be dependent on the physical properties of the materials to be excavated, which could vary from place to place on-Site, e.g., depth, method of original deposition, moisture content, levels and types of radionuclides, other co-located contaminants, etc., as well as the degree of safety with which the operation can be achieved, in terms of impacts to both on-Site workers and off-Site populations.

Preference for Treatment as a Principal Element

The statutory preference for remedies that employ treatment as a principal element is satisfied for soil through the use of measures to reduce the volume of radioactive soil requiring off-Site disposal.

No action, treatment or otherwise, was considered by the Agency to be the best groundwater remedy after evaluating it against the nine criteria.

DOCUMENTATION OF SIGNIFICANT CHANGES

There are no significant changes from the preferred remedy presented in the Proposed Plan.

APPENDIX I

FIGURES

APPENDIX II

TABLES

APPENDIX III

ADMINISTRATIVE RECORD INDEX

APPENDIX IV

STATE LETTER OF CONCURRENCE

APPENDIX V

RESPONSIVENESS SUMMARY

RESPONSIVENESS SUMMARY

Li Tungsten Superfund Site
Operable Units 1 and 2
City of Glen Cove, Nassau County, New York

INTRODUCTION

A responsiveness summary is required by regulations promulgated under the Superfund statute. It provides a summary of citizens' comments and concerns received during the public comment period, as well as the responses of the United States Environmental Protection Agency (EPA) to those comments and concerns. All comments summarized in this document have been considered in EPA's final decision involving selection of a remedy for the Li Tungsten Superfund site. EPA is addressing the cleanup of the site in two remedial phases or operable units. Operable Unit 1 includes the former Li Tungsten facility. Operable Unit 2 consists of portions of the nearby Captain's Cove property. EPA's final decision regarding the site remedy incorporates both operable units.

SUMMARY OF COMMUNITY RELATIONS ACTIVITIES

The Remedial Investigation (RI) report for Operable Unit 1, the Focused Feasibility Study (FFS) for Operable Unit 2 and the Feasibility Study (FS) for both operable units and the Proposed Plan for the site were released to the public for comment on July 28, 1999. These documents, as well as other documents in the administrative record (see Administrative Record Index, Appendix III) have been made available to the public at information repositories maintained at the EPA Region II Docket Room in located at 290 Broadway, New York, New York and the Glen Cove Public Library, located at 4 Glen Cove Avenue, Glen Cove, New York. A public notice announcing the public meeting on the Proposed Plan as well as the availability of the above-referenced documents was published in Newsday on July 28, 1999. The public comment period established in the public notice was from July 28 to August 27, 1999. Requests for an extension to the public comment period were granted by EPA and the public comment period was extended through September 17, 1999. EPA's decision to extend the comment period was announced at the August 16, 1999 public meeting on the Proposed Plan, as well as publicized through mailings to the more than 150 citizens and other interested parties on the site mailing list.

The August 16, 1999 public meeting was held at the Glen Cove City Hall, located at 9 Glen Street, Glen Cove, New York, to present the Proposed Plan and to address questions and comments concerning the Plan and other details related to the RI, FFS and FS reports raised by local officials, residents and other interested parties. Responses to the comments and questions received at the public meeting, along with other written comments received during the public comment period, are included in this Responsiveness Summary.

In the early 1990's, EPA entered into a cooperative agreement for pilot studies with Clean Sites, Inc. to evaluate approaches to improve the Superfund process and facilitate remediation at sites. EPA selected the Li Tungsten site as a pilot for Clean Sites to facilitate the remediation process for the site most notably through early stakeholder involvement and early identification of the most realistic future use of the site. Clean Sites conducted interviews of State/local government officials, local organizations, potentially responsible parties,(PRPs) and interested members of the community, and developed a citizen’s advisory group called the Li Tungsten Task Force in March 1994. Although Clean Sites’ cooperative agreement expired in July 1996, the Task Force has continued to conduct monthly meetings with EPA without Clean Sites’ involvement, usually on the first Thursday of each month. The purpose of these meetings is to share data and information with the Task Force as it becomes available, in order to obtain early and frequent input from the community concerning EPA’s activities. The Task Force also applied for and received a technical assistance grant (TAG) from EPA in September 1995.

Attached to this Responsiveness Summary are the following Appendices:

Appendix A - Proposed Plan
Appendix B - Public Notice
Appendix C - August 16, 1999 Public Meeting Attendance Sheet
Appendix D - Letters Submitted During the Public Comment Period

SUMMARY OF COMMENTS AND RESPONSES

Comments were expressed at the public meeting and written comments were received during the public comment period. While the public seemed generally supportive of the remedy at the public meeting, EPA subsequently received over 700 identical (form) letters asking that EPA change the proposed alternatives for soil remediation from Alternatives LS-4 and CS-4 (which include soil separation to reduce the volume of radiologically-contaminated soil) to Alternatives LS-2 and CS-2 (which do not include volume reduction). The letters also requested that EPA take adequate preventive measures to control fugitive dust, establish radioactive air monitoring stations during cleanup activities and conduct further risk assessment analyses. Because of the large number of letters received, EPA decided to begin its response to comments by addressing these comments first in Section A of this Responsiveness Summary.

Other significant major issues and concerns expressed by interested parties including members of the public relate to the cost evaluation of the soil alternatives; EPA's failure to consider on-site containment of radionuclide-contaminated soils; safe implementation of the selected remedy; funding of the remedial action; human health and risk assessment issues; and enforcement-related issues.

The specific comments have been organized as follows:

A. Public Concerns Stated in a Form Letter of which EPA Received over 700 Copies
B. Public Health and Risk Assessment Issues
C. Remedy Selection Issues
   i) general
   ii) cleanup levels/ARARs
   iii) data/volume estimates
   iv) remedial action cost estimates
   v) on-site containment
   vi) radionuclide separation
D. Remedy Implementation Issues
E. General Enforcement Issues
F. General Site Issues

A summary of the comments and concerns and EPA responses thereto are provided below:

A. Public Concerns Stated in a Form Letter of Which EPA Received Over 700 Copies

Comment #1: The public requested that EPA select Alternatives LS-2 and CS-2 in place of Alternatives LS-4 and CS-4 because of concerns related to fugitive dust.

Response #1: Both pairs of alternatives, i.e., Alternatives LS-4 and CS-4 and Alternatives LS-2 and CS-2, call for the excavation, transportation and off-site disposal of large volumes of radiologically and nonradiologically contaminated soil. The difference between these pairs of alternatives is that Alternatives LS-4 and CS-4 call for the use of a volume reduction technology to minimize the volume of radiologically-contaminated soil that must be disposed of off-site. As indicated in the Proposed Plan and described in the Record of Decision, EPA has determined that volume reduction measures would be employed, but has not specified the use of a particular volume reduction technology. However, in the event that separation of radionuclide-contaminated soil from nonradionuclide soil contaminated with heavy metals cannot be accomplished in a cost-effective manner, the excavated soils will be disposed at appropriately licensed facilities as described in Alternatives LS-2 and CS-2 in the Decision Summary of this Record of Decision.

One of the key benefits of soil volume reduction is the lowering of disposal costs, which represent a significant portion of project costs. Some of the soil separation methods include surgical-type excavation techniques and ex-situ physical separation processes, e.g., the SGS or segmented gate system, to separate the radiologically-contaminated soils from other soils. As the transportation and disposal of these materials are very costly, any large reduction in the quantity of radiologically-contaminated would significantly reduce remediation costs at the site. The Superfund law does require EPA to implement remedies in a cost-effective manner.

During design, EPA will evaluate the various volume reduction methods to determine whether any would be effective for use at the Li Tungsten site and, if so, to what degree. For the Glen Ridge and Montclair/West Orange Radium sites in Essex County,
New Jersey, neither soil washing nor SGS was found to be cost- effective. However, the soils at most sites are different, thus necessitating a similar evaluation of the Li Tungsten soils. It should also be noted, in response to an expressed concern, that fugitive dust emissions from such a separation process are insignificant. To the extent that dust control measures become necessary during cleanup activities, they result mostly from excavation of the contaminated soil as well as loading of the soil onto trucks. Here too, EPA has developed extensive experience in controlling any fugitive dust emissions associated with these operations.

Comment #2: Commentors raised concerns regarding the generation and transport of fugitive dusts during cleanup operations, especially during any ex-situ separation activities if employed. The commentors wanted to know how EPA would ensure protection of off-site receptors from radioactive dust emissions. Commentors requested that: monitoring stations be set up at the site and in Glen Cove and surrounding communities; the community be notified if contamination migrated beyond the site boundary during construction; a sprung structure or other containment be included in the cleanup plan to prevent radioactive dust from migrating from the site; and a comprehensive and detailed safety and monitoring plan be incorporated into the Record of Decision.

Response #2: EPA is sensitive to the concerns of the community regarding the airborne transport of contaminants during the implementation of the remedy. Fortunately, EPA has significant experience in controlling fugitive emissions during construction at chemically-contaminated and radioactively-contaminated Superfund sites across the country. Protection of off-site receptors can be achieved through a combination of health and safety monitoring, site control procedures and engineering controls. These controls are routinely used at all Superfund sites requiring excavation or other earth-moving activities.

Examples of health and safety monitoring activities that can be implemented include the following: perimeter radionuclide monitoring; perimeter dust monitoring; establishment of conservative action levels and appropriate emergency response actions if the action levels are attained. During the Remedial Design, a Health and Safety Plan (HASP) will be developed for the site. The HASP will comply with the standards outlined in 29 CFR 1910.120, referred to as Hazardous Waste Operations and Emergency Response (HAZWOPER) standards. These standards contain specific requirements to minimize the health and safety hazards associated with actions at hazardous waste sites. In addition, the HASP will include other Occupational Safety and Health Act (OSHA) safety standards for traditional construction activities. An Emergency Response Plan (ERP) is a required element of the HASP and includes a description of how to handle potential site emergencies and how to minimize the risks associated with a response. Although the details of the monitoring program will be developed during the design, it is anticipated that at least two monitoring stations to measure dusts and radionuclides will be established at the perimeter of the site; the need for monitoring stations in the community, though not thought necessary at this time, will be further evaluated when the HASP is developed. Monitoring programs typically include provisions for specific actions to be taken when concentrations at the monitoring station reach certain levels; these actions might include employment of specific construction control methods or the cessation of construction. The action levels established are typically quite conservative, to ensure that actions are taken before unsafe levels are observed at the perimeter of the site. The ERP will include procedures for notifying local, State and Federal officials. Since local emergency responders may be involved in certain emergency responses, EPA will invite local officials and/ or emergency responders to participate in developing the ERP.

Examples of site control procedures that are likely to be implemented include the following: misting soils with water to maintain dust levels as low as possible without compromising operation of the equipment; covering piles; ceasing operations when windspeeds are high; scanning and decontamination of vehicles and/or vehicle tires before leaving the site. Examples of engineering controls include the following: use of temporary structures, such as a sprung structure, to enclose the excavation/separation areas and the use of separation equipment that is designed to minimize dust emissions. The need for such is typically included in the remedial design documents so that it is readily apparent to the construction contractor that these or similar measures will need to be employed to minimize the generation of fugitive dust.

As indicated above, EPA has extensive experience in the cleanup of sites contaminated with radiological materials. At the Glen Ridge and Montclair/West Orange Radium sites in Essex County, New Jersey, EPA has been cleaning up residential and public properties since 1991. Radiologically-contaminated soil originating from a nearby radium processing facility in the early 1900s was used to bring low-lying areas in the residential communities up to grade. Several hundred homes were subsequently built on top of the contaminated soil. The contamination extends down to about fifteen feet below the ground surface in many locations. Removal of the contaminated soil requires that the houses be underpinned and subsequently restored to their original conditions. To date, more than 150,000 cubic yards of contaminated soil have been successfully removed from hundreds of properties at a cost of over $200 million.

Similar to the Glen Cove community, the residents of the densely-populated Essex County communities were very concerned about the contamination and cleanup project. EPA worked closely with local officials and affected residents to address their concerns. Health and safety plans and monitoring programs as well as transportation plans were developed with considerable input from the communities. Monitoring stations were established around the perimeter of the impacted areas to ensure that no contaminated materials migrated away from the site. All vehicles leaving the site were thoroughly decontaminated and scanned, again to ensure that the vehicles would not carry contaminated dirt onto local roads. The trucks carrying contaminated soil away were securely covered and checked with scanning monitors so that fugitive dust would not impact residential areas. These and other measures have enabled EPA to implement the cleanup project without incident. The experiences gained at the Essex County sites as well as sites in Orange, Maywood, and Wayne, New Jersey will be used to make the cleanup of the Li Tungsten site as successful.

Comment #3: The ROD should provide details of all safety control measures that will be utilized to prevent any migration of radiological dust off-site, including air monitoring procedures.
Response #3: As noted above, the details of the air monitoring program will be developed during the design as part of the HASP. Again, it is important to point out that the ROD describes a remedy in general terms, while future plans developed during design determine exactly how the remedy will be implemented, including all relevant details of site operations.

Comment #4: The public requested a further risk assessment analysis of the various cleanup options proposed and a public education effort resulting in a better understanding of the risks associated with the various cleanup options.

Response #4: As part of the Feasibility Study, cleanup criteria are determined for the appropriate chemicals of concern identified in the risk assessment using risk assessment procedures. The cleanup goals must meet the first two of the nine criteria, i.e., protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The alternatives are designed to reduce the existing risk and are evaluated based on the remaining seven criteria, i.e., long-term effectiveness, reduction of toxicity, mobility or volume through the use of treatment, short-term effectiveness, implementability, cost, state acceptance and community acceptance. The alternatives are evaluated to make sure that the remediation will not create any additional risks or hazards. Once a final remedial alternative is selected, the remedial design will incorporate an evaluation of the potential exposures to the surrounding populations and develop appropriate measures to reduce or eliminate this exposure. Actions may include wetting the soils for dust suppression, installing monitors to identify the potential for contaminants to move off-site, location of equipment to minimize exposure to residents, etc.

The further risk assessment analysis for different cleanup alternatives that is requested is similar to EPA's comparative analysis of "short-term effectiveness" which is one of the nine evaluation criteria. The short-term impacts of all of the excavation alternatives are similar and pertain to generation of fugitive dust and the volume of soil that must be transported from the site. Alternatives LS-4 and CS-4 may include an insignificant increase in fugitive dust compared with Alternatives LS-2 and CS-2, and there is no discernable difference in terms of risk between these pairs of alternatives. However, without using a soil volume reduction technology, the increase in the number of trucks traveling through the community for Alternatives LS-2 and CS-2 would have more potential to negatively impact the community because the potential for accidents would increase. Please also refer to EPA's response to Comment 1.

Concerning the request for public education, EPA is committed to working with the community to keep residents informed of all site-related activities and addressing their concerns throughout the cleanup process. EPA agrees that continuation of its community involvement, particularly with organizations like the Li Tungsten Task Force, is important to keep the public apprised of the progress being made at the site, and to continue to solicit community input on those issues which have been demonstrated as being of community interest and concern.

Note: EPA received other specific concerns and comments on remedy implementation that were not included in the form letter. These are addressed in detail in Section D of this Responsiveness Summary.

B. Public Health and Risk Assessment Issues

Comment #5: The only safe level of uranium in air is absolutely zero, since humans cannot tolerate any exposure.

Response #5: EPA disagrees with this statement. Project- related increases to background level of airborne uranium are expected to be minimal. Review of the Agency for Toxic Substances and Disease Registry Toxicological Profile for Uranium (September 1997) indicates, that uranium is a naturally occurring radionuclide that is present in nearly all rocks and soil. Uranium becomes airborne due to direct releases into the air from anthropogenic (human-induced) and natural processes. The background levels of uranium suggest that individuals are being exposed to uranium based on background exposures. The introductory section of the Toxicological Profile further concludes "The Committee on the Biological Effects of Ionizing Radiation (BEIR IV) reports that eating food or drinking water that has normal amounts of uranium will not likely cause cancer or other health problems in people. The Committee reports that if people steadily eat food or drink water containing 1 pCi of uranium every day of their lives, bone sarcomas would be expected to occur in 1 to 2 of every million people based on the radiation dose. However, this is not known for certain because even enriched uranium has not been shown to cause bone sarcomas in people or animals."

Comment #6: Was the cancer survey in Glen Cove in 1990 done throughout the entire city and what was the time frame of the Study?

Response #6: According to the New York State Department of Health (NYSDOH), the cancer survey was performed within a study area conforming to the zip code 11542, which corresponds closely to the boundaries of the City of Glen Cove. The survey used data from the New York State cancer registry from the years 1978 to 1987. This ten-year time frame was chosen because in 1989 when the study was begun, cancer reporting was considered complete for analysis within small geographic areas through 1987.

Comment #7: Incidents of unspecified illnesses and cancers may be attributable to the Li Tungsten facility. People need to know whether they have been or are being affected by the contamination at the site. A new cancer survey should be implemented which includes those who are or have lived or worked within a one-half mile radius of the site.

Response #7: According to NYSDOH, its Cancer Surveillance Program completed in 1990 an investigation of cancer incidence for zip code 11542 (Glen Cove). In summary, a statistically significant deficit of cancer cases overall was observed for females. No significant differences were observed among males overall. Within specific anatomic sites of cancer, a statistically significant deficit of female breast cancer cases was observed. A statistically significant excess of malignant melanoma was observed among males in the study area. No other sites among males or females were found to demonstrate excess or deficit of cases.

With respect to former employees at Li Tungsten, in 1989-90 the New York State University at Stony Brook's Division of Occupational Medicine conducted a preliminary medical surveillance program in response to public concerns that former employees might have increased risk of health effects due to exposures from on-site contaminants. They concluded that workers are not at an increased risk for adverse health effects due to their work exposures at the Li Tungsten facility.

Cancer incidence data are generally available for the county level. The NYSDOH is currently developing statewide cancer information for areas smaller than counties. This is part of the Cancer Surveillance Improvement Initiative, also known as the cancer mapping project. These sub-county maps will provide communities with easy access to basic information about cancer incidence in their geographic area. Anyone with concerns about cancer near the Li Tungsten site can contact the NYSDOH Center for Environmental Health at 1-800-458-1158 to discuss their specific concerns.

Comment #8: How close is the nearest off-site resident who is currently at an unacceptable risk from airborne particulates?

Response #8: The model used to estimate risk from airborne transport of dust predicted that residents along the northeastern portion of the Li Tungsten property line could be at risk. Exposed areas at the site do have the potential to emit fugitive dust due to the action of the wind. This process of wind erosion can result in the transport of contaminated dust particles downwind. Dust particles with an aerodynamic diameter below PM10 can be inhaled. The fate of these inhalable particles was estimated using the EPA-approved atmospheric dispersion model (Industrial Source Complex Model) and modeling techniques to calculate the downwind air concentrations. The model considered emissions from multiple ground level area sources and the resulting impact at five receptor locations.

The five receptor locations represent locations at or near the fence line in the northeastern portion of the property. The five receptor locations were all at ground level. It should be noted, however, that the model was quite conservative; the model also assumed that the contaminated areas did not have any ground cover. As most of the site is covered with vegetation or building structures/foundations, the actual amount of exposed contamination which could actually be subject to airborne transport is limited.

Comment #9: What were the specific risks to off-site residents, and the contaminants responsible for them?

Response #9: The current cancer risks to the off-site adult and child resident were 1 in 10,000 with arsenic as the primary contaminant of concern. This risk is at the upper bound of EPA's acceptable risk range.

The noncancer hazard was 20 based on manganese and cobalt for the adult resident. The noncancer hazard for the child was 90 based on exposure to cobalt and manganese. These values exceed EPA's acceptable Hazard Index of 1.

In considering the results of the risk assessment, it is important to note the uncertainties associated with the model that may overestimate the risks and hazards. Possible overestimates could derive from the following: the model assumes no terrain; the maximum annual average impacts regardless of meteorology were used in the calculations; the emissions were considered to be from an "unlimited reservoir;" and the assumption was made that no vegetative cover exists.

Comment #10: The separation process in LS-4/CS-4 would create a lot more radioactive airborne dust (than LS-2/CS-2). This dust would shorten the life spans of potentially thousands of people in the community, because it takes only one inhalation or ingestion of a radioactive dust particle to cause cancers and mutations, and in pregnant women, birth defects or fetal death. If radioactive gammas or betas are deposited in the lung, it will increase lung cancers and cause thousands of premature deaths.

Response #10: In conducting human health risk assessments for chemicals and radioactive materials capable of causing cancer, EPA assumes a potential increased risk associated with each exposure; however, this increased risk may be extremely small (EPA Cancer Guidelines, 1986, 1992 and 1999). Combining information on the toxicity of the chemical or radioactive material with information on the exposure routes (i.e., inhalation, ingestion and dermal contact) and frequency and duration of exposure, EPA calculates specific risk levels and compares these with an acceptable risk range set in the National Contingency Plan (1 in 10,000 to 1 in 1,000,000); this information can then be used to calculate levels of contaminants which present an unacceptable risk. These risk levels are presented in the Remedial Investigation. During the Feasibility Study, this same methodology can be utilized to develop health protective concentrations to assure potential exposures to residents are within EPA's risk range.

The statement suggests that thousands of people will be exposed during remediation at the site; such a conclusion is not consistent with wind patterns and population areas at the site as well as the nature of the waste and the controls to be exercised at this site. The remedial design will evaluate the potential routes of exposure by which an individual may be exposed and work to reduce this exposure to within specified risk levels. Techniques that have been used at other sites to reduce exposure include wetting the soil to suppress dust, setting up monitors on the fence line to detect whether radioactive particulates are released during the remedial activities, and selection of locations within the property for separation of materials to minimize potential exposures to nearby residents. If certain remedial processes (e.g., ex-situ separation of materials) cannot be safely implemented, they will not be employed.

The remedial design will assure that exposure is minimized to within acceptable risk levels and that all appropriate and relevant regulations are met that protect residences near the site as well as site workers. The standards that will be used include the appropriate air regulations promulgated under the Clean Air Act for radioactive elements (40 CFR Part 61) and appropriate worker regulations. These standards are developed at the national level to be protective of sensitive populations including children and adults.

Comment #11: Because the ores were ground to a very fine consistency as part of the processes at Li Tungsten, this material when dry will be extremely prone to becoming airborne. Radioactive particulates small enough to become airborne defy many of the dose model (RAGs and RESRAD) risk assessments in use by the health risk assessment community. Consequently, we believe the risks calculated in the radiation risk assessment could have been skewed too low for inhalation as well as ingestion. This hypothesis is supported by experimental and epidemiological evidence from the examination of radiation effects of particulate alpha-emitters deposited in the lung. There is additional risk also attendant to airborne dust containing arsenic, a well known carcinogen.

Response #11: It is important to note that the risk assessment has indicated potential risks under future site use scenarios in <u>excess</u> of the EPA acceptable range of 10E-4 to 10E-6; therefore, even if the baseline risk assessment had underestimated risks, the risks were still deemed sufficient to take remedial action. Additionally, the presence of powdered ore residuals is not uncommon as most ore processing involves the grinding down of the ore to increase the surface area, thereby maximizing extraction efficiency. The finer ore materials at such sites however, are typically found “blended” with soils and other waste materials, which typically contain moisture in the percentage range, and therefore do not exhibit the properties associated with fine powders.

EPA uses chemical and radiological specific cancer slope factors for evaluating inhalation and ingestion of the various radioactive elements and chemicals identified as contaminants of concern at the site. The cancer slope factor provides a measure of the lifetime excess total cancer risk per unit intake or exposure. The evaluation of these data involves a comprehensive evaluation of the human epidemiological literature, which for radiological data primarily comes from studies of workers in mines where exposure is much higher than that in the general environment. Following the selection of a specific animal or epidemiological study, EPA uses appropriate models to extrapolate from the higher worker exposures to the lower environmental exposures that may occur in the general environment. The models are designed to be protective of the general populations by the incorporation of a 95% confidence limit that is protective of the majority of the population. The methodologies used are provided in the EPA Cancer Guidelines (1986, 1992 and 1999), the on-line Integrated Risk Information System, and the Health Effects Assessment Summary Tables (1997 and 1995). Since the cancer slope factors are based on human epidemiological data where appropriate, or animal data if the human data are not adequate, the conclusion that the risk assessment is skewed is not appropriate.

In evaluating the potential human health risks through inhalation and ingestion, EPA evaluates data from animal laboratory studies and/or human epidemiological studies when available to develop cancer slope factors for chemicals and radiological contaminants. These studies are further evaluated using appropriate models to extrapolate from the higher levels of exposure experienced by workers in the case of radiological contamination to potential environmental exposures. The toxicity information is then combined with site-specific exposure information to calculate the risks. Information on particulate sizes are evaluated to the extent that they are available in the human epidemiological data used in the development of the toxicity cancer slope factors.

Comment #12: The TAG advisor commented on risks which might be posed should the site ever be used for residential purposes after the proposed remediation is implemented; the advisor noted that if deed restrictions fail, and residences are built on-site, the risk would still fall between 10-4 and 10-6, within EPA’s risk range. EPA has allowed as high as 20 ppm of arsenic to remain in soil at residential areas at other Superfund sites.

Response #12: It is true that the commercial use based cleanup level developed for arsenic (24 ppm) at the site is close to a level which might be acceptable for residential use. An arsenic soil concentration of 20 ppm would result in a Hazard Index of 1 for a child resident and a cancer risk of approximately 5 x 10E-5 at the Li Tungsten site. A concentration of 24 ppm could possibly be considered marginally acceptable as a residential cleanup number.

Comment #13: The radionuclide data set is highly biased, and skewed towards higher concentrations; the use of maximum measured radionuclide concentrations thus leads to an unrealistic radiation risk assessment. If mean rather than maximum concentrations were used at Captain’s Cove, several future receptors, e.g., site worker at Area A and construction worker in Area G, would no longer be an unacceptable risk scenario.

Response #13: The radionuclide data set is skewed slightly towards higher concentrations for conservatism since 95% upper confidence limits on the average concentrations or the maximum detected concentrations are used as exposure point concentrations. This conservatism is generally used to account for uncertainties and unknown subsurface concentrations that might be higher than the measured radionuclides concentrations.

Comment #14: The radiological risk assessment did not use radionuclide depth/distribution profile when deriving exposure point concentrations. This is an important consideration when external gamma radiation is the dominant contributor to effective dose equivalent (EDE) and evaluation of excess risk.

Response #14: The radionuclide risk assessment did consider radionuclide depth/distribution profiles when deriving exposure point concentrations. The soil pathway was evaluated based on *surface soil* or *all soil*, as appropriate for the potentially exposed population. *Surface soil* (first two feet of contamination) data were used to evaluate potential exposure to trespassers and site workers, while *all soil* (surface and subsurface) data were used to evaluate potential exposure to construction workers and residents.

Comment #15: In the FFS, the exposure point concentrations (EPCs) used to calculate a reasonable maximum exposure grossly overstate external gamma exposure. The EPCs are not consistent with exposure rate measurements at the Li Tungsten facility and Captain's Cove. The resultant risks calculated are overestimated by two orders of magnitude, and therefore, the need for remedial action based on external gamma radiation risks is not justified for the site.

Response #15: Exposure rate data cannot be used to estimate potential health risks because of the uncertainty associated with measuring gamma radiation from commingled radionuclides at different energies. The EPCs used to estimate external gamma radiation exposure were appropriately calculated based on the measured radionuclide concentration data.

Comment #16: The risk assessment fails to distinguish the incremental risk posed by the sites from the risk posed by background levels of the contaminants of concern, particularly for radionuclides at Captain's Cove.

Response #16: Radionuclide concentrations due to natural background were accounted for. For example, the site worker scenario in Appendix G in Volume II of the Draft Final Feasibility Study Report, Table 6.4 (last column), shows the cancer risk in surface soil due to site contamination and natural background "gross"; Table 6.5 (last column), shows cancer risk in surface soil due to natural background only; and Table 6.8, (last column), shows the net "gross risk - background risk" cancer risk.

Comment #17: The risk assessment uses biased sampling to estimate potential sources of exposure. EPA explains that the values calculated on those data sets are a conservative estimate of the reasonable maximum exposure (RME). These values are overly conservative, and result in unrealistic assessments of both radionuclide and chemical risk. The use of biased sampling artificially raises the calculated 95% upper confidence limit (UCL) for risk assessment. A Monte Carlo statistical analysis should have been used, due to the biased nature of the data.

Response #17: The central tendency analysis conducted in the FFS is based on the RME exposure point concentration and inclusion of average exposure information. Based on the lack of site-specific exposure information, it was determined that the application of a Monte Carlo analysis would not be appropriate for this site.

Comment #18: The risk assessment evaluates a groundwater pathway where none exists. The groundwater pathway should be eliminated from the risk assessment.

Response #18: It is true that the pathway for groundwater exposure is not complete under the current use scenario; however, this is not sufficient justification to eliminate the groundwater pathway risk assessment. EPA must consider the best beneficial use of aquifers beneath Superfund sites. Drinking water happens to be the best beneficial use of the Upper Glacial Aquifer which New York State has classified as IA. In addition, the results of the RI indicated that groundwater and drinking water standards were exceeded, and in some localized areas metals were significantly above standards. Given the above information, EPA determined that an assessment of risks due to exposure of groundwater under a future use scenario was appropriate.

Comment #19: The risk calculations assume that 100% of the soil ingested during every exposure event contains the highest concentration of each contaminant. Use of mean or median concentrations, even with overly conservative default assumptions used in the FFS, yield estimated risks that are generally within or below the acceptable risk range.

Response #19: The values used in calculating the EPCs represent a range of values including maximums and 95% UCLs on the mean. As shown in the tables in Appendix O of the RI Report summarizing the Medium Specific Exposure Point Concentrations, the 95% UCL was calculated where adequate information was available for chemicals. The calculation of the exposure point concentrations followed EPA's guidance on calculating the 95% UCL. As stated in the guidance, if a 95% UCL on the mean cannot be calculated, then the maximum concentration should be used. The use of a mean or median concentration suggested in the comment is inconsistent with EPA's guidance.

Comment #20: Default assumptions used assume that the body absorbs 100% of the ingested or inhaled dose. However, bioavailability of metals is a critical factor in assessing risks since inorganic metal species typically have lower adsorption rates. Physiologically-based/Pharmacokinetic (PB/PK) modeling should have been used to determine the actual adsorbed dose. Ignoring the effects of the soil matrix on decreasing bioavailability may result in substantial overestimation of site risks.

Response #20: Currently, EPA is developing guidance on evaluating bioavailability of metals. The comment does not address the significant resources that will be necessary to conduct a bioavailability study on a site of this size. First, it would be necessary to conduct studies in swine or another animal model to develop bioavailability data. Since studies at a site in Denver found considerable variability in bioavailability across that site, it would be necessary to conduct studies on several different samples from the Li Tungsten site. In addition, it may be necessary to conduct studies on several different chemicals. Associated with these activities would be the separation of the individual chemicals so that they could be tested. Tests of this nature cost $100,000 or more for each chemical and animal species in addition to a considerable amount of time that would be necessary for each of the individual studies. Therefore, it is not feasible to conduct the types of studies identified in the comment at this time, especially since this is a new procedure that has not been adequately evaluated for different metals and soil types.

Comment #21: There is a high degree of uncertainty regarding the cancer slope factor for arsenic. There is also a growing body of scientific literature demonstrating a threshold effect for arsenic; that is, a dose that has no adverse effect. Given these uncertainties, a risk-based cleanup criteria based on a noncancer endpoint would be appropriate. Other EPA Regions have used cleanup levels for arsenic of up to 480 mg/kg at industrial sites using this approach. Arsenic cleanup criteria in this range would be appropriate for this site, given future development plans, land use restrictions, as well as the two-foot protective soil cover.

Response #21: The comment fails to identify which EPA program office has determined this significant uncertainty regarding the cancer potential of arsenic. Within the Superfund program, the Integrated Risk Information System (IRIS) toxicity values are used in the risk assessment. Until the value in IRIS which represents the Agency's consensus on specific chemicals is changed, the Superfund program continues to use the IRIS values. When the IRIS updating process for arsenic has been completed, and the IRIS value is modified, it will be incorporated in future risk assessments.

In addition, the Risk Assessment Guidance for Superfund - Part B sets forth a methodology for evaluating cleanup goals based on both cancer and noncancer toxicity. The suggestion of calculating only a noncancer cleanup goal is inconsistent with EPA's policy and guidance. In addition, the planned development of this site is commercial/light industrial where the potential exists for young children to be present. Therefore, an industrial cleanup value where only adults may be present at the site would not be appropriate. Furthermore, assessment of the appropriateness of soil cleanup numbers cannot be done without consideration of groundwater quality. One of the objectives of the soil cleanup remedy is to minimize additional cross-media impacts of soil contaminants on the groundwater; arsenic was present in some groundwater samples at concentrations which were several orders of magnitude above the maximum contaminant level (MCL) for arsenic. The rationale for not selecting a groundwater remedy at the site included the assumption that remediating the soils to the proposed cleanup numbers would thereby eliminate the continuing source of contamination, and significantly improve the groundwater quality at the site.

Comment #22: Residential lead screening levels were inappropriately utilized in the FFS to establish site cleanup criteria. OSWER Directives 9355.4-12 and 9200.4-27P state that 400 mg/kg is a residential screening level and that screening levels are not cleanup goals. The 400 mg/kg screening level for lead is for residential exposure by children under 7 years of age and is based on exposure to lead-based paint. Also, lead in lead-based paint exhibits a higher degree of availability relative to lead-containing minerals such as those found at the site.

Response #22: As described above, the 400 mg/kg screening level is based on running the Integrated Environmental Uptake and Biokinetic (IEUBK) Model in default mode and is not based on the presence of lead-based paint at Superfund sites since lead-based paint is excluded from the assessment. EPA's use of 400 mg/kg is not inconsistent with the OSWER directives. The 400 mg/kg level is used at Superfund sites for screening for residential exposure to soil. Since the potential development of this site is commercial future use (ferry terminals, museums, restaurants etc.), where children may be exposed to lead in the soil, this concentration was selected to be protective of these younger children.

Comment #23: The point of departure for developing lead cleanup criteria should have been 1,700 mg/kg which is EPA's interim screening level for industrial sites. Lead cleanup criteria in this range is appropriate for the site given the planned future development, proposed land use restrictions and protective soil cover. Risk-based cleanup criteria are sufficiently protective when the anticipated land use is considered.

Response #23: It is unclear how the 1,700 mg/kg value identified by the Commentors was developed since a reference is not identified. If the Adult Lead Model methodology were used in developing this cleanup value, the comment only lists the highest value. The adult lead model usually considers a range of values from 750 to 1,750 mg/kg and does not default to the maximum concentration as suggested in the comment. In view of the anticipated use of the property as commercial where children under the age 7 may be exposed, the use of the interim screening level for lead is not inappropriate.

Comment #24: The risk assessment assumed residential exposures in setting some cleanup criteria, which is inconsistent with the site development plan.

Response #24: The risk assessment cleanup value for arsenic is based on a 1 x 10E-6 value for construction workers. The lead value is based on the potential for children to be on-site and the use of the IEUBK Model in default mode.

Comment #25: In developing chemical cleanup criteria for the site, realistic default assumptions were not used for the exposure scenarios or for developing the criteria. Overly conservative assumptions regarding exposures and dose were used that resulted in cleanup criteria that are essentially residential levels. The risk assessment should be re-done, using more realistic exposure scenarios and dose equivalents, and ultimately more realistic cleanup levels, followed by a more thorough data evaluation to delineate impacted areas for targeted removal actions.

Response #25: The risk assessment was performed using appropriate exposure variables identified in EPA's 1992 guidance on default exposure assumptions that represent Reasonable Maximum Exposure. The issues identified in the comment have been responded to previously in EPA's responses to other comments in this section of the Responsiveness Summary.

C. Remedy Selection Issues

i) General Issues

Comment #26: The feasibility study analysis clearly favors Alternatives LS-2 and CS-2 over any of the other soil alternatives. The best way to clean up the site is complete removal of toxic waste from the site, especially radioactive waste, which presumably would be done under Alternatives LS-2 and CS-2. Shouldn't Alternatives LS-2 and CS-2 be the preferred remedy, since these alternatives surpass Alternatives LS-4 and CS-4 in protecting human health and the environment, even though Alternatives LS-4 and CS-4 meet this criterion?

Response #26: EPA believes that the protectiveness of public health and the environment afforded by either pair of alternatives in terms of the extent of cleanup is identical, i.e., both pairs of alternatives must meet the same numerical cleanup criteria that will be applied to soil left at the site. In addition, the methods to achieve these cleanup levels are similar, i.e., excavation with off-site disposal. Alternatives LS-4 and CS-4 allow whoever prepares the remedial design, whether it be EPA or a PRP group, the flexibility of segregating waste streams to reduce disposal costs. This alternative is clearly preferable from the perspective of the cost-effectiveness balancing criterion. As both alternatives require excavation and off-site transportation of soils, both will require controls to minimize the generation and off-site migration of dust. While some segregation methods may involve extra handling of contaminated materials, the fugitive dust emissions from such separation processes are insignificant relative to the emissions resulting from excavation and loading activities required for these alternatives mentioned in the comment. In the event that separation of radionuclide-contaminated soil from nonradionuclide soil contaminated with heavy metals cannot be accomplished in a cost-effective manner, the excavated soils will be disposed at appropriately licensed facilities as described in Alternatives LS-2 and CS-2 in the Decision Summary of this Record of Decision.

Comment #27: There's an absolute need to place the health and safety of the people of Glen Cove above monetary and all other considerations.

Response #27: The two primary Superfund evaluation criteria, often referred to as *threshold* criteria, are to assure protection of public health and the environment, as well as to meet ARARs (applicable or relevant and appropriate requirements). These criteria must be met in any Superfund cleanup. Cost-effectiveness, on the other hand, is a *balancing* evaluation criterion, and is meant to help differentiate between various alternatives that have already passed the protectiveness "test." The community has raised a concern regarding the additional materials handling required under Alternatives LS-4 and CS-4. Measures which will be implemented to ensure that the additional handling is performed safely are discussed in EPA's response to Comment 2.

Comment #28: Since semi-volatile compounds were found at dangerous levels in at least one location on the site, semi-volatiles should be addressed as part of the cleanup plan.

Response #28: While semi-volatiles, specifically a group of semi-volatiles known as polyaromatic hydrocarbons (PAHs),were found at relatively high levels on Parcel A, levels of PAHs found at the remainder of the site were very low. These PAHs on Parcel A are believed to have originated from coal and wood processing done at the ste around the turn of the century. It is not unusual to find these contaminants in commercial/industrial settings. EPA's risk assessment found that the semi-volatile compounds found on Parcel A of the Li Tungsten site would not present a risk under a commercial land use scenario.

Comment #29: If the cleanup numbers are already pretty low, then why wouldn't you clean up the site to a pristine level?

Response #29: The cleanup numbers must achieve the threshold evaluation criteria of protection of human health and the environment, and compliance with ARARs; beyond that, they are evaluated on other criteria such as construction impacts, cost-effectiveness, etc. Cleaning up the site to a pristine level in this case means leaving "background" levels of the site contaminants behind, since virtually all the contaminants of concern at this site exist naturally in low concentrations. The closer the cleanup gets to background levels, the more exorbitant the cost -- with virtually no "extra" return on the investment in terms of increasing protectiveness.

Comment #30: Is Glen Cove Creek involved in the cleanup plan?

Response #30: No, however, EPA has been monitoring the sediments and water column of Glen Cove Creek; monitoring will continue on an annual basis as part of the long-term response action at the Mattiace Superfund site. The results of this monitoring program, as well as the groundwater monitoring program for Li Tungsten which is part of Alternative LW-1, will be integrated to provide a comprehensive analysis of the contaminant profile in groundwater and in the Creek, and to identify any discernible interrelationships or trends. As noted in the discussion on Glen Cove Creek under the Summary of Site Characteristics section of the ROD, approximately 12,000 cy of sediment were dredged from the mouth of the Creek in 1996; sampling results from monitoring location GC-03, located in this dredged area, indicate significantly lower contaminant levels than previous results for this area. In addition, the planned dredging of the remainder of the Creek this Fall/Winter, which will include dredging of the entire width of the Creek fronting virtually all of Parcel A to a depth of 8 feet, will result in the removal of approximately 35,000 cy of sediment. This sediment removal coupled with EPA and New York State Department of Environmental Conservation (NYSDEC or DEC) remedial actions planned for the Li Tungsten facility and Captain's Cove, as well as other actions planned or underway for other Federal or State sites, should result in significant improvement in the water quality and sediment quality in the Creek. The year 2000 monitoring event should provide valuable information regarding potential beneficial impacts of the Army Corp dredging effort; EPA and DEC will consider whether additional sampling locations should be added for this effort. In addition, the year 2000 monitoring results will be utilized by EPA and DEC to evaluate whether the monitoring program should be expanded to include ecological monitoring or toxicity testing.

Comment #31: If Alternative LS-2 had been cheaper than Alternative LS-4, would that have been the preferred alternative?

Response #31: Yes, obviously the additional time and effort required to achieve some separation of waste streams would not be desirable unless it achieved a reduction in cost. In the event that separation of radionuclide-contaminated soil from nonradionuclide soil contaminated with heavy metals cannot be accomplished in a cost-effective manner, the excavated soils will be disposed at appropriately licensed facilities as described in Alternatives LS-2 and CS-2 in the Decision Summary of this Record of Decision.

Comment #32: A hydro-mechanical mining technique similar to dredging might be employed for soil removal, especially for the deeper contamination at Captain's Cove. This process would involve, after excavating the surficial uncontaminated soil, saturating the contaminated soil with water until slurry is formed. The slurry would then be pumped out of the hole into tanker trucks or drums thereby minimizing the probability of airborne contaminants.

Response #32: Potential issues related to the idea of hydro-mechanical mining include: 1) this is an untested technology for this type of application; 2) control over the limits of soil removal would be compromised because you would not be able to see what you are removing - therefore, disposal quantities would likely increase substantially; 3) post-excavation verification sampling of an amorphous sediment pit would be more difficult than a dry excavation pit; 4) there would probably be a large potential for the spread of contamination to groundwater during the operation; 5) this method would render the volume reduction technology or controlled excavation ineffective because it would mix radioactive with nonradioactive soils; therefore, disposal costs would be higher because all material would need to be sent to a specialized disposal facility.

Comment #33: The selection of Alternative LW-1 is appropriate, in that it is unnecessary and would be unduly costly to design and construct any active groundwater remediation and treatment system. Deed restrictions should be adequate to assure future nonuse of the aquifer.

Response #33: EPA agrees that the relatively small portion of the Upper Glacial Aquifer that is impacted by the site does not warrant remediation at this time, because EPA believes the condition will improve over a relatively short period of time once the contaminated soils are removed. In addition, the availability of City water and various institutional controls makes the hypothetical use of contaminated groundwater during that time extremely unlikely. The progress of aquifer improvement will be periodically monitored during the five years after the start of remedial action for soil, and then will be formally assessed at the time of EPA's first <u>Five- Year Review</u> for this site. EPA could choose to amend the Record of Decision concerning aquifer remediation, should circumstances at the time of the Review warrant it.

Comment #34: EPA should select an action alternative for groundwater, because the costs associated with groundwater remediation are relatively low with respect to the overall site remedy, and this way, 5-year reviews would not be necessary and public health would be better protected.

Response #34: The cost of groundwater remediation is low relative to the overall site remedy, however, EPA believes that groundwater remedial action is unwarranted at this time. See response to preceding comment. Also, if either Alternative LW-2, LW-3, or LW-4 were selected, EPA's <u>Five-Year Reviews</u> would still need to be conducted during the period that the groundwater was being actively remediated.

Comment #35: Why can't the building(s) be knocked down?

Response #35: Two large structures, <u>i.e.</u>, the Dice Complex and the East Building, were razed during EPA removal activities at the Li Tungsten facility. The selected remedy includes demolition of several additional buildings to eliminate hazards posed by structural instability, hazardous materials of construction (i.e., asbestos) or contamination with radionuclides, as well as to facilitate both pre-design sampling and implementation of future remedial actions. In order to satisfy these objectives, it is likely that all but two of the original structures will need to be demolished.

Comment #36: Limiting access, by means of security, warning signs, fencing, etc. is not an effective way to overcome the dangers posed by the site.

Response #36: EPA agrees that restricting access is not a long-term protective solution given the expected commercial future use of the site and therefore has selected a remedial action involving excavation, radionuclide separation, and off-site disposal of the various wastes contaminating the soil. Warning signs and limited access to the site, however, will remain in effect on part of the site until the remedial actions are completed, which is presently anticipated in the year 2002.

Comment #37: Alternatives LS-2 and CS-2 should be selected for soil and Alternative LW-3 for the groundwater. While these alternatives may be more costly, the added costs when divided between the PRPs is insignificant and will ensure that the sites are fully cleaned up. These remedial measures will also impact the surrounding areas less.

Response #37: Please refer to EPA's responses to Comments #26 and 34.

Comment #38: It is critical for the Proposed Plan alternatives to factor in rail transportation for the removal of this waste, as a safer and more cost-effective method.

Response #38: The Proposed Plan's costs for soil alternatives involving off-site disposal of radionuclide wastes were based on truck transportation from the site to a Massachusetts transfer facility, followed by rail transportation to EnviroCare of Utah (footnote #3 of soil alternatives, Appendix D of the Feasibility Study). The choice of disposal facility and location are for cost-estimating purposes only. The actual facility and mode of transportation will be selected at the time of radionuclide waste disposal.

Comment #39: Deed restrictions on the two tracts of real property which make up the site to prevent the potable use of contaminated groundwater that underlies the site, should be expanded to include all potential uses of groundwater, such as irrigation, cooling, etc. Deed restrictions on residential use should also be aimed at day-care centers, schools, and similar child-oriented uses, which are ordinarily allowable on commercially-zoned land.

Response #39: EPA has noted in the ROD that deed restrictions on the site property would likely include controls to ensure the protection of public health through restrictions on groundwater withdrawals for any purpose that could lead to human exposure, e.g., drinking water, irrigation, fountains, etc. until the groundwater beneath the site has reached cleanup levels. These restrictions would also likely require that any new construction at the site adhere to relevant building codes for radon/thoron gases.

EPA recently entered into a settlement with the prospective new owners of the site property, i.e., the City of Glen Cove Industrial Development Agency. This settlement, referred to as a "Prospective Purchaser Agreement," reserves for EPA the right to require that restrictions known as "institutional controls" (which could include deed restrictions, easements, and/or zoning ordinances) be established on the future use of the site. This reservation will also apply to successors in title to the Industrial Development Agency.

Comment #40: In order to make the remedy consistent with the TAGMs (which EPA by law must do unless it grants itself a waiver), EPA proposes to impose deed restrictions forbidding future residential development. The ability of deed restrictions to prevent residential development is dubious.

Response #40: The NY State TAGMs are soil cleanup objectives which are not ARARs, but rather are “to be considered” (or TBCs) in the formulation of cleanup levels for soil at Federal Superfund sites. Therefore, EPA does not require a waiver if it does not select TAGM levels as its cleanup criteria. Moreover, EPA’s purpose in requiring institutional controls was not to make the cleanup levels functionally equal to TAGMs, but rather to complement the selection of cleanup levels that are compatible with commercial future use. The commercial future use evaluated in EPA’s risk assessments for Li Tungsten and Captain’s Cove resulted in cleanup levels that were not as stringent as the cleanup levels that would have been required had the future use been assumed to be residential. Therefore, EPA believes that institutional controls, while not a guarantee of a specific future use, are nevertheless important in directing commercial future uses of the site.

Comment #41: The Agency has indicated that the final remedy would include radon testing in all buildings constructed on the Li Tungsten property. However, this was not noted in the Proposed Plan.

Response #41: To mitigate future impacts of radon and/or thoron, any new construction on this site would need to adhere to relevant building codes pertaining to radon. The selected remedy section of the ROD describes institutional controls requiring radon code compliance.

Comment #42: The site does not pose an unacceptable risk due to the presence of naturally occurring radioactive material (NORM). Independent RESRAD modeling demonstrates that the residual risks due to NORM presented in the FFS were overestimated by two orders of magnitude. The process utilized in identifying and screening remedial alternatives did not adequately consider the effectiveness of the prior removal actions in reducing site-related risks, particularly radiological risks, nor do the estimates take into account the attenuation of gamma radiation by the 2-foot protective cover described in the Proposed Plan. Measured exposure rates after completion of the removal actions provide risk estimates that are within EPA's acceptable risk range of 10E-4 to 10E-6.

Response #42: Independent RESRAD modeling that demonstrates an overestimation of two orders of magnitude may be due to a variety of factors including the exposure pathways considered, the site-specific parameters used and how the model was set up. Without a detailed comparative analysis of the two methodologies that were used (EPA's vs. independent), the finding does not necessarily mean that the EPA's risk estimates are substantially overestimated.

The risk assessment performed was a baseline risk assessment which does not incorporate the remedial alternatives that were selected. The protective cover, therefore, is not considered in the risk assessment model.

Comment #43: The time required to implement the selected remedy was significantly underestimated in the FFS and cannot be completed within the 16-month period presented in the Proposed Plan. The schedule presented in the FFS did not adequately account for completing the source reduction using the SGS system. This technology has significant limitations which limit its throughput and capacity. Also, the volumes of soil to be processed are underestimated, and will require additional time to process. Three to six years will be required to complete the remedial activities outlined in the Proposed Plan. Targeted removal using precision excavation can be accomplished in significantly less time, while achieving a comparable level of protection.

Response #43: EPA estimated in the Proposed Plan that remedial action at Li Tungsten and Captain's Cove would take nine months and seven months, respectively, for a total of 16 months under Alternatives LS-4 and CS-4 (the Selected Remedy). EPA utilized SGS throughputs of approximately 175-200 cubic yards/day during the development of these estimates, which do not include the time to perform remedial design activities. These throughputs are consistent with the literature on this particular separation technology. Other separation strategies, techniques, or technologies may ultimately be used that can achieve effective separation even faster and cheaper. These would have to be evaluated by EPA for safety and effectiveness during remedial design.

Comment #44: Targeted removal of select "hot spots" and construction of protective covers, which are integrated into the overall site development plan, provides similar protection to the Proposed Plan if realistic and credible risk-based criteria are applied. Targeted removal is equally protective of human health and the environment and can be implemented in a significantly shorter time frame. The Proposed Plan already incorporated a two-foot soil cover along with land use restrictions. Protective covers can easily be integrated into the site development plan and design, as have been successfully demonstrated at other Superfund Brownfield sites. Targeted removal can also be completed in less time and at a lower cost because it is driven by scientifically defensible reductions in site risks.

Response #44: EPA believes that "targeted removal" of selected hot spots is a modified containment alternative which, on the one hand, substantially reduces the risks associated with the highest contaminant levels on the site, but on the other hand, fails to adequately control the on-site risks attendant to lower level contaminants being left on the site. EPA's "two-foot soil cover" cited by the Commentors is in reality a minimum backfill requirement to afford additional protectiveness for the two pairs of off-site disposal Alternatives LS-2 and CS-2, and LS-4 and CS-4. EPA's on-site containment Alternatives LS-3 and CS-3 would include a much more permanent and protective RCRA-type cap. EPA does not feel that the on-site containment portion of the Commentors's suggestion is sufficiently protective. Further, upgrading the on-site containment to meet EPA's remedial objectives would result in an alternative very similar to Alternatives LS-3 and CS-3, which were evaluated by EPA but not selected. Additionally, please see the response to Comment #78 concerning the applicability of the Long Island Landfill Law.

Comment #45: It is possible and plausible that all or most of the radioactive material would be acceptable for disposal at a RCRA Subtitle D facility, since it is properly classified as NORM. A licensed radiological disposal facility need not be the disposal location for some or all of the radioactive wastes at the site. Perhaps, only "hot spot" materials would require disposal at a licensed facility, with the rest going to a Subtitle D.

Response #45: EPA-Region II is not aware of any instance where NORM waste has been disposed of at a RCRA Subtitle D facility. However, depending on the activity level, it may be possible to dispose of some of the radionuclide-contaminated soils/residues at a RCRA Subtitle C facility. During remedy implementation, all available disposal options will be investigated in order to find an appropriate facility.

Comment #46: Treatability studies are needed to determine efficiencies of separation technologies under Alternatives LS-3 and CS-3 and Alternatives LS-4 and CS-4, as well as stabilization technologies associated with Alternatives LS-3 and CS-3.

Response #46: Comment noted. EPA expects that all necessary testing needed to implement the selected remedy will be completed during remedial design activities. In the event that separation of radionuclide-contaminated soil from nonradionuclide soil contaminated with heavy metals cannot be accomplished in a cost-effective manner, the excavated soils will be disposed at appropriately licensed facilities as described in Alternatives LS-2 and CS-2 in the Decision Summary of this Record of Decision.

ii) *Cleanup levels/ARARs*

Comment #47: What's the difference in terms of numerical standards between a commercial cleanup and a residential cleanup, based on other Superfund sites?

Response #47: EPA guidance requires that the most reasonably anticipated future land use for a site be determined, and that the site be cleaned up to allow for that use. EPA typically performs a baseline risk assessment to determine whether contamination at the site presents an unacceptable risk under current and potential future uses of the site. The risk in turn is dependent on various considerations like the contaminants of concern, the exposure assumptions, likely exposure pathways, dose assumptions, etc. which vary from site to site. EPA can then utilize this information to develop corresponding cleanup levels which would allow the various site uses to occur. Therefore, the cleanup level for a particular contaminant - for example, arsenic - could be different for this site when compared to another site that was also evaluated vis-a-vis a commercial future use. After determining the range of risk-based cleanup levels, EPA evaluates whether there are any ARARs which provide numerical cleanup levels which are more stringent than the risk-based cleanup level being targeted. If so, then the ARAR would be used. These ARARs could be either Federal or State standards, and therefore may vary from state to state.

In summary, the cleanups performed at Superfund sites across the country are highly site-specific and can be quite variable in terms of cleanup numbers used. However, it is usually true that a site with an expected residential future use will have more stringent cleanup numbers than if that site had been evaluated for commercial future use (although, if an ARAR is applied at a site, it would result in the same cleanup number regardless of future use). In any event, care and thorough evaluation should be used when comparing the cleanup levels at different Superfund sites.

Comment #48: The principle of reducing radiation exposures "as low as reasonably achievable" should prevail.

Response #48: The principle cited in the comment could be a factor in certain ARARs that contain cleanup standards based on what is considered achievable given the present state of technology; however, it is decidedly not a factor in EPA risk assessment methodology. When assessing risk, EPA believes that incremental risk between 10^{-4} to 10^{-6} (or 1 in 10,000 to 1 in 1 million) for cancer incidence, or Hazard Indices of less than 1, are sufficiently protective. Although technology could possibly reduce the cleanup number further in some cases, the exorbitant costs would no longer justify the extremely small increment of protectiveness thereby obtained. In the case of radionuclides at Captains' Cove and Li Tungsten, EPA feels that the selected cleanup levels from the risk assessment for the selected radioisotopes of radium and thorium are fairly close to their naturally-occurring background levels; therefore, in this case, EPA believes that its selected remedy is relatively close to meeting the "as low as reasonably achievable" principle.

Comment #49: The cleanup target for arsenic in the Proposed Plan, i.e., 27 ppm, has been changed from the value in the draft FS, i.e., 7 ppm, which was the State's TAGM. This reduces the amount of soil to be disposed of and cuts the cleanup costs by tens of millions of dollars.

Response #49: The cleanup target for arsenic in the Proposed Plan is actually 24 mg/kg (or 24 ppm). This is a risk-based number that was generated utilizing the construction worker exposure scenario. TAGM's are not based on any site-specific data. TAGMs were derived from broad literature survey data of uncontaminated soils throughout New York State, the U.S., and Canada. Background concentrations of arsenic in soils throughout New York State range as high as 16 mg/kg; at other locations in the U.S., up to 73 mg/kg. The actual TAGM value for arsenic is 7.5 mg/kg or site background. The average concentration of arsenic in seven background samples at Li Tungsten was 6.3 mg/kg, indicating that some background samples were greater than 7.5 mg/kg. The concentration of arsenic in approximately 80% of all soil samples collected at Li Tungsten (88 samples) and 75% of all soil samples collected at Captain's Cove (39 samples) exceeded 7 mg/kg. At Li Tungsten and Captain's Cove, radionuclides and inorganics are generally co-located in the soils. As a result, removal of radiologically-contaminated soils will also remove most of the arsenic-contaminated soils. There will be relatively small amount of soil with arsenic concentrations ranging between 7 and 24 mg/kg that are not co-located with radiologically- contaminated or other inorganic-contaminated soils and will remain in the ground after remediation is completed. The reduction in cleanup costs for this of soil, however, should be much less than $1 million and would not begin to approach tens of millions of dollars.

Comment #50: The arsenic and lead cleanup criteria are inconsistent with cleanup levels established for other Brownfields industrial sites having similar patterns of contamination and physical characteristics.

Response #50: Please see EPA's Response to Comment #47 above which discusses how cleanup numbers can vary given site specific circumstances. Further, the future use of this site is commercial, not industrial. Additionally, the cleanup criteria utilized were based on CERCLA (not Brownfields) procedures as described in the National Contingency Plan and other relevant CERCLA-related guidances.

Comment #51: EPA's use of residential cleanup criteria is clearly inappropriate and inconsistent with OSWER Directive #9355.7-04.

Response #51: While EPA evaluated residential future use for this site, the radionuclide and heavy metals cleanup numbers that will be used for soil are derived from a risk assessment evaluation of commercial future use, except for lead and to a lesser extent, PCBs. EPA's use of 400 mg/kg for lead is not inconsistent with the OSWER directives. The 400 mg/kg level is used at Superfund sites for screening for residential exposure to soil. Since the potential development of this site is commercial future use (ferry terminal, museums, restaurants etc.), where children may be exposed to lead in the soil, this concentration was selected to be protective of these younger children.

Based on the available data, the lead cleanup level will not drive the soil cleanup in areas where it is co-located with arsenic and the radionuclides of concern.

PCBs are only anticipated to be found in an isolated location in the middle of Parcel B, co-located with heavy metals and radionuclides. EPA's cleanup level for PCBs in the selected remedy is based on NY State's TAGM values of 1 mg/kg in surface soil, and 10 mg/kg in subsurface soil. The risk-based construction worker scenario from EPA's risk assessment at Li Tungsten resulted in a 10.1 mg/kg cleanup level; therefore, EPA made a risk management decision to use the TAGM for the incremental protection it afforded in surface soils, at an anticipated low incremental cost.

Comment #52: No specific regulatory prohibitions were identified which preclude containment in place. The Long Island Landfill Law and 6 NYCRR Part 380 are cited as reasons why on-site management options were not more fully considered. However, these laws only address new disposal and not capping in place. Additionally, 6 NYCRR part 380 does not specifically require removal of NORM to meet the State gamma radiation exposure limits.

Response #52: EPA generally has not selected containment remedies for radiologically-contaminated waste materials. Unlike many types of chemical contaminants, radiological contaminants remain dangerous for very long periods of time. The toxicity of a radiological substances is measured in terms of its half life, or the amount of time necessary for the substance to lose half of its toxicity or potency. For example, the half life of radium 226 is 1600 years. It would take more than 5000 years for radium to lose 90 percent of its potency and more than 10,000 years to lose 95 percent of its toxic characteristics. If such materials were placed in a landfill, perpetual maintenance would be required to ensure the integrity of the landfill containment system (both the landfill cover and the liner) to prevent leaching of the radiological materials to underground waters. Also, institutional controls would have to be established to ensure no contact with the contained materials. Like the maintenance requirements, the institutional controls would have to be maintained and enforced for thousands of years. Needless to say, EPA is extremely concerned about the long-term effectiveness and reliability of such perpetual controls, especially in a populated area such as Long Island. For these reasons, facilities licensed for the disposal of radiological wastes are located in remote areas of the country in areas where people do not live and where groundwater is not used for potable purposes.

Beyond the above technical issues, an on-site landfill would inhibit reuse of the site property. Although portions of the property could be redeveloped for some purposes, restrictions would have to be placed on other portions preventing development. Such restrictions are inconsistent with the redevelopment goals of EPA's Brownfield initiative. For all of the preceding reasons, EPA believes on-site containment of the radioactive wastes is not a viable remedial option for the Li Tungsten site. It also should be noted that on-site containment has not been selected as the appropriate remedy for any of the radiologically-contaminated Superfund sites in New York or New Jersey. Rather, all have involved off-site disposal of the contaminated materials.

New York State regulation 6 NYCRR Part 380 does not specifically require the removal of NORM to meet State standards for protection against gamma radiation. However, in order to limit total radiation doses to individual members of the public, Part 380 establishes such standards for gamma radiation exposure that may result from the disposal and discharge of certain radioactive material to the environment. Such material would include NORM resulting from processing or concentrating ores; the NORM found at the Li Tungsten site resulted from processing and concentrating ores, and therefore EPA believes that Part 380 was appropriately applied in evaluating the selected remedy.

Comment #53: The radiological cleanup levels established for the site are unduly conservative for the future commercial use of the site. The cleanup levels are significantly lower than levels of naturally occurring radioactivity on Long Island. Black sands from 18 different beaches in Long Island easily exceed the cleanup levels specified in the Plan, and so do granite rocks found along the Ronkonkoma and Harbor Hill Ridges in the middle of Long Island. According to the FS, these cleanup levels are based on the cleanup standards promulgated by EPA pursuant to Uranium Mill Tailings Radiation Cleanup Act (UMTRCA). However, the cleanup standards ignore the 15 pCi/g cleanup standard below 15 cm depth, as required by 40 CFR 192. At this site, the critical element in meeting the intent of the UMTRCA regulations contained in 40 CFR part 192 is limiting gamma radiation exposures, since residential radon exposure is not an issue. Acceptable risk levels and exposure limits can be achieved through targeted removal, implementation of land use restrictions, and a two-foot protective cover as specified in the Proposed Plan. Use of UMTRCA in its entirety could possibly reduce the amount of soil requiring remediation, and thus reduce the cost.

Response #53: As noted in the comment, background levels can be found that exceed the selected radionuclide cleanup levels. The two important considerations are risk, and the immediate background concentration of the radionuclide. The cleanup levels for radionuclides were derived from a site-specific risk assessment. Furthermore, background levels of the radionuclides of concern at the site are sufficiently below risk-based cleanup levels so that remedial action can reasonably take place. Consequently, the selected remedy is considered appropriate and protective by EPA.

The FS correctly identified 40 CFR 192 as a <u>potential</u> applicable or relevant and appropriate requirement. EPA subsequently determined that the standards set forth in this regulation were standards "to be considered" (or TBCs) but not ARARs, because the site was not sufficiently similar to uranium mill tailing sites which that regulation addresses. Even if 40 CFR 192 had been identified as an ARAR for the site, EPA guidance directs that the non-health based at-depth standard of 15 pCi/g is not an applicable or relevant and appropriate standard at sites such as Li Tungsten (see OSWER Directive No. 9200.4-25 "Use of Soil Cleanup Criteria in 40 CFR Part 192 as Remediation Goals for CERCLA Sites"). Nonetheless, using 40 CFR 192 as a TBC, EPA's site-specific risk assessment found that the standard of 5 pCi/g in 40 CFR 192 for surficial soils was protective, while the 15 pCi/g standard in that regulation for soils at-depth was not.

Comment #54: The FFS treated the Mud Pond and Mud Holes as viable aquatic habitats. These pits were used in ore processing activities and are not unique aquatic environments. Application of State ambient water quality criteria to standing water in these pits is not an appropriate use of the criteria; neither is using State sediment criteria (a TBC) to clean up the sediments in these pits.

Response #54: As noted, the Mud Pond and Mud Holes were utilized in ore processing activities. EPA will need to remove the soils underlying these areas, and in order to due so, the overlying materials, <u>i.e.</u>, ponded water and sediments, must be removed. These contaminated materials will be disposed of off-site at an appropriate disposal facility and will not be remediated as the comment suggests. Cleanup levels associated with the underlying contaminated soils will ultimately drive the volume of material from these areas that is shipped off-site for disposal.

iii) Data/volume estimates

Comment #55: The Proposed Plan makes no mention of the radioactive elements Polonium-210 and Lead-210, although there's a possibility of the presence of these two contaminants, according to a report prepared by Disposal Safety which reviewed the FS. If these radionuclides are present, then the proposed cleanup would not be effective, since they weren't sampled for and cannot be detected by gamma-detecting field instruments. It is requested that the public be advised of the analyses done in relation to these substances, and if there's any uncertainty, an evaluation must be completed before any plan of action is taken.

Response #55: EPA did not consider these two radionuclides to be potential radionuclides of concern, and hence did not sample for them during the fieldwork at Li Tungsten or Captain's Cove. However, based on a comment made by the TAG advisor for the Li Tungsten Task Force made during the review of the draft RI Report, EPA decided to perform some limited sampling and analysis for these two radionuclides at locations and conditions suggested by the TAG advisor. The results of the sampling and analysis conducted by EPA in March 1999 suggested that these radionuclides are not of concern at the site, and therefore, they were not discussed in the Proposed Plan. The results of this work is attached in Appendix B, Volume I of the FFS. The TAG advisor has commented on the inclusion of this work and considers the limited site characterization performed in March to be responsive to his concern (see EPA's response to Comment #112). Nonetheless, EPA will collect additional samples for these radionuclides, as well as the radionuclides of concern, during pre-design sampling to further define the excavation areas and volumes.

Comment #56: Additional sampling data obtained in March 1999 were not fully integrated into the FFS, and do not support the conclusions presented in the report regarding the limits of contamination in some areas.

Response #56: While the report from the March 1999 sampling event was included in the FS (Volume I, Appendix B), a discussion of the additional sampling results was not included in the context of the earlier more extensive RI and FFS sampling and analyses. However, the results *were* integrated into the FS Report to the extent that volume estimates and costs were modified for Captain's Cove as a direct result of the additional sampling.

Comment #57: The soil borings under the easternmost condo shell at Captain's Cove contained in the March 1999 data only extended 4 feet below ground surface. The majority of radiological contamination in this area (Area G) was encountered at depths greater than 4 feet, so the EPA sampling missed most of the contaminant zone. More importantly, the geoprobe sample (a composite) exceeded proposed cleanup criteria for radium. Also, the northern limits of and eastern contamination in Area G have not been defined. Area A was similarly not adequately defined in terms of areal extent of radiological contamination.

Response #57: There were four soil borings under the easternmost condo shell; namely, borings 41, 42, 43, and 44. Table I of the Trip Report indicates that these samples were composited over sample depths of 4-8 feet, 0-8 feet, 0-8 feet, and 0-8 feet, respectively. EPA believes that a uniform depth of 8 feet was sufficient to detect any ore residuals that may have been located under the shell. One sample, Sample 044, exceeded the 5.0 pCi/g cleanup level for Ra^{226} with a measurement of 9.7 pCi/g. For purposes of volume estimating, EPA considers this result potentially anomalous, given that samples 041 and 043 were closer to Area G and not contaminated with radionuclides. However, EPA will further investigate this area during pre-design sampling.

Comment #58: The basis of the volume estimates used in the engineering evaluation and cost estimates are not clearly documented. Even less clear are the reasons for the significant volume differences presented in the draft FS and draft final FS.

Response #58: Much of the basis for the volume estimates are contained in the RI Report for Li Tungsten and the FFS Report for Captain's Cove. The basis for the cost estimates are contained in Appendix B, Volume I of the FS Report. EPA believes that the level of detail provided in these documents is appropriate for FS estimates. The significant differences in volume estimates that occurred from the draft FS to the draft final FS were primarily as a result of a reconsideration of the volume estimates for Captain's Cove. The ore residuals located at Captain's Cove were buried at both Areas A and G, up to 14 feet deep in some places. EPA's consultant, Malcolm Pirnie, first estimated these sub-surface volumes in the draft FS/FFS. EPA felt these first estimates were based on unduly conservative assumptions, most likely because of the buried nature of the materials, and requested a re-evaluation. These "mid-course" revisions frequently occur between first draft and final draft of Superfund documents as part of the process to produce a final document of good quality. Typically, these drafts are not reviewed by the public. At this site, however, EPA has made draft documents public as part of its pilot study with Clean Sites to share information as it became available with the community.

Comment #59: The site characterization data were not sufficient to accurately estimate waste volumes and remediation costs, thereby skewing the comparison of alternatives. An example of such inaccuracy is the wide variation of cost estimates between the draft FS and the Final FS. Based on the same site characterization data and the same cleanup standards, Alternatives LS-2 and CS-2 went from $70 million in the draft FS to $32 million in the final FS. Underestimation of volumes makes off-site disposal alternatives appear more cost-effective and skews the evaluation of alternatives in favor of these alternatives.

Response #59: EPA disagrees and believes that the data were sufficient to characterize and determine the extent of contamination over the 50 acres of property associated with the Li Tungsten facility and Captain's Cove property for purposes of supporting a remedy. EPA agrees that further characterization, as well as pilot/treatability testing, is necessary during design to prepare remedial design plans and specifications. The commentor is correct in that underestimation (or, for that matter, overestimation) can skew an alternatives analysis. This is the main reason why EPA sought to have its

RI/FS consultant re-evaluate the volume estimates for Captain's Cove, which EPA believed were too conservative.

Comment #60: It's unclear from the data whether high hits represent isolated "hot spots" or are representative of a pattern of concentrations at the elevated levels. At Captain's Cove, the NYSDEC surface radiological survey, which would measure radioactivity only in the upper soil layer, as well as the limited subsurface soil investigation would not be sufficient to fully characterize the radiological contents of Captain's Cove.

Response #60: Both comments are correct; when measuring any subsurface phenomenon, much of the data collected require certain extrapolations to get a sense of the "complete picture." This "picture" will, in a sense, only be completed when remedial excavation takes place and the exact boundaries of the subsurface volumes are uncovered. However, EPA believes that field investigation results at Captain's Cove were of sufficient quantity and quality to select a remedy for the radiologically-contaminated materials.

iv) Cost estimates for remedial actions

Comment #61: What was the difference in cost in cleaning up the semi-volatile organic compounds (SVOAs) at the Site to residential vs. commercial scenario standards?

Response #61: For a residential exposure scenario, a total of approximately 9,000 cubic yards of additional SVOA contaminated soil would need to be removed, virtually all from Parcel A. Costs for excavation, transportation and disposal at a Subtitle D facility (using the unit rates in the Final FS Report) for these soils would be on the order of $1.5 million. Other miscellaneous costs, e.g., engineering, construction management and contingencies, would raise this figure to approximately $2 million. Hence, an additional $2 million would be required to upgrade the SVOA cleanup from a commercial level to a residential level.

Comment #62: If groundwater isn't cleaned now, and EPA decides 5 years from now, after performing the rest of the remediation that an active groundwater remedy is necessary, would the groundwater alternatives cost significantly more?

Response #62: Groundwater remediation may cost more due to inflation. However, the groundwater quality is expected to improve after the contaminated soil and ore residuals are removed. As a result, if groundwater treatment were still deemed to be necessary, a smaller, less costly groundwater remediation system than would currently be needed may be suitable.

Comment #63: Shouldn't a range of costs be presented for each alternative, as well as the preferred alternative, to account for some of the uncertainties in the estimate?

Response #63: Ranges of costs are not typically provided in FS or Proposed Plan documents. EPA attempts to arrive at FS estimates that, when implemented, will be correct to within a range of +50% to -30%; this objective is typically discussed in the FS. The FS estimate also includes a 15% contingency for the cost of construction to account for some of the "hidden" costs of actual construction, which become evident later during design and as construction proceeds.

Comment #64: The costs presented do not accurately reflect the real cost of transportation and disposal of radioactive soil. Economies of scale, rail vs. truck, plus a turnkey contract combining disposal and transportation would all achieve cost savings not included in the Proposed Plan.

Response #64: EPA agrees that there is potential for cost savings during implementation of the remedy. These cost savings are typically determined during a "value engineering" exercise which is conducted during the remedial design. Nonetheless, EPA believes that the cost estimates in the FS are based on realistic assumptions, and are accurate to within +50% and -30% of the actual costs of construction. More refined cost estimates will be developed during the design.

Comment #65: The analysis of remedial alternatives did not consider the impacts on cost or schedule that contaminated materials below the water table at Captain's Cove might have; this could add $100,000 to $500,000 to the cost.

Response #65: It was assumed that there would not be a significant volume of contaminated materials below the water table at Captain's Cove to significantly impact cost or schedule. The depth to groundwater in Area A, as determined during two rounds of groundwater measurements in monitoring wells MW-6 and MW-8, generally ranged from 10 to 11 feet below ground surface (bgs). The maximum concentration of radiologically-contaminated materials in Area A generally occurred between 2 to 10 feet bgs. The depth to groundwater in Area G, as determined from two rounds of groundwater level measurements in monitoring wells MW-7 and CDM-1, generally ranged from 7 to 13 feet bgs. The maximum concentration of radiologically-contaminated materials in Area G generally occurred between 2 to 12 feet bgs. Consequently, the great majority of soils to be excavated are expected to be above the water table.

Comment #66: The cost presented in the FFS to implement the selected remedy was underestimated by approximately $30 million to $75 million, due to unsupported assumptions regarding the effectiveness of the source reduction activities and underestimated volumes of the soil that exceed the proposed cleanup criteria. Even if EPA's soil volumes are correct, the cost of the Plan is still underestimated by $22 million to $52 million.

Response #66: EPA disagrees and believes its assumptions regarding radionuclide separation and general volume estimates are reasonable for the purposes of cost estimating, as discussed in its previous response. In the event that separation of radionuclide-contaminated soil from nonradionuclide soil contaminated with heavy metals cannot be accomplished in a cost-effective manner, the excavated soils will be disposed at appropriately licensed facilities as described in Alternatives LS-2 and CS-2 in the Decision Summary of this Record of Decision.

Comment #67: The estimated costs do not appear to have included stockpiling and staging the excavated materials prior to source reduction activities or transport to an off-site disposal facility. The FFS estimated site excavation costs at $2.75 per cubic yard. Actual costs for excavation, stockpiling and staging removed soils at a cleanup site in New York were $33/cubic yard. Similarly, actual soil removal costs at the Metcoa Radiation site were $55/cubic yard. Using the estimated soil volumes in the FFS, the excavation costs were underestimated by $1.7 to 2.8 million.

Response #67: Stockpiling and staging of excavated soils was factored into the processing cost, not the excavation cost. Rail transportation costs for all radiological-contaminated materials were included in Alternatives LS-2 and CS-2, Alternatives LS-3 and CS-3, and Alternatives LS-4 and CS-4; truck transportation costs for all nonradiological-contaminated materials were included in Alternatives LS-2/CS-2 and Alternatives LS-4/CS-4.

Comment #68: No costs for backfill were included, which could range from $750,000 to $1.1 million.

Response #68: Backfill costs were inadvertently omitted from the cost estimate. Some areas where ore residues were stockpiled or disposed of at the surface (e.g., Dickson Warehouse, middle portion of Parcel B, and upper portion of Parcel C) will not require backfill in amounts equivalent to the volume of cubic yards removed. While the cost of backfill might approach the cost indicated, because it is missing from all alternatives, the relative cost differences between alternatives would not change.

Comment #69: The unit cost for disposal of radiologically- contaminated soils is significantly lower than quotes obtained from private PRPs. The unit costs for disposal used in the FFS appear to be low by a factor of 2 to 5 times. If volumes in the FFS are correct, then this underestimation could range from $8 to 28 million. If the volumes are underestimated, then disposal costs are underestimated by $12 million to $42 million.

Response #69: The unit costs for disposal of radiologically- contaminated material were based on an actual contract rate that has been established between EPA Region II and the Corps of Engineers, and EnviroCare of Utah, Inc. While EPA's cost estimate does represent the cost of an EPA-lead cleanup, we believe that similar costs could be achieved even if the cleanup were conducted by the PRPs.

Comment #70: Actual disposal costs at Subtitle D landfills in the region were $30 per ton in the last year, a figure well below the value used in the FS. Therefore, increasing the amount of materials that can go to a Subtitle D landfill will significantly reduce costs.

Response #70: Disposal of nonradioactive material in a Subtitle D landfill, regardless of the actual dollar/ton cost, is the least expensive disposal option of any considered in the FS. This in itself provides strong justification for the use of an effective volume reduction technology or strategy. The effectiveness of the volume reduction is directly proportional to the cost savings that can be realized on disposal costs.

Comment #71: The cost estimates in the FS do not address the following tasks:

- Construction of truck loading facilities, such as roadways, ramps, truck-washing facilities etc., demobilization of these facilities, as well as decontamination efforts at the truck-to-rail transfer station.

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- Health physics and material sampling program, including training, personnel and equipment monitoring, effluent and environmental monitoring, medical checks, site access control, sample collection and control, and analyses using on-site or off-site labs.

- Administrative and management costs.

- On-site administrative offices, sample storage and facilities, wash facilities.

- Reimbursement of Agency costs and their consultants for oversight of the project.

- Development and implementation of a public awareness and education program for all alternatives.

- Decontamination of building debris before disposal at a Subtitle D facility.

Response #71: Cost estimates were developed in accordance with EPA's Remedial Action Costing Manual (EPA, 1985) and include direct, indirect and annual Operations and Maintenance (O&M) costs. The estimates are intended to be conceptual cost estimates, not detailed construction cost estimates. As stated previously, the estimated costs made during the FS are expected to provide an accuracy of +50% to -30%, based on the data collected during the RI. EPA believes that the costs derived for the FS are within these limits. In addition, EPA believes that the estimated FS costs account for nearly all of the items identified in the above tasks, except EPA oversight costs which are typically not included. More detailed cost estimates which will be prepared during remedial design will include the individual costs of most of the items listed above.

Comment #72: Concerning Alternatives LS-2 and CS-2, remediation may have to address substantial quantities of mixed wastes. No volume estimates or cost estimates of mixed wastes were provided.
Response #72: Analytical data (e.g., chemical, radiological and TCLP analyses) of ore residue samples collected from the Dickson Warehouse as well as other radiologically-contaminated soil samples were sent to EnviroCare. Based on examination of those samples, EnviroCare indicated that it would not consider this material as mixed waste. Therefore, no disposal costs for mixed waste were included in the FS report.

Comment #73: There is no cost component for Alternatives LS-3 and CS-3 for construction of an on-site containment cell, although costs for a RCRA capping system are estimated.

Response #73: EPA acknowledges that the footnotes and explanations provided with the cost estimates for Alternatives LS-3 and CS-3 could have been written more clearly. The costs did include construction of a cell (10 feet deep) over approximately 0.9 acre for Alternative LS-3 and 1.36 acres for Alternative CS-3.

Comment #74: Reported unit costs using SGS are significantly higher than the $55/cubic yard assumed in the FFS and Proposed Plan, ranging from $87/cubic yard to $236/cubic yard (DOE Reports). Mobilization/demobilization costs are also not included in the FFS, and could range from $100,000 to more than $500,000. The costs to manage oversize material by screening, crushing, etc. was also not included. This could cost approximately $75/ton, or a total of $325,000 to $500,000 for the entire site.

Response #74: The processing cost has been found to vary significantly with the volume of soil scheduled to be processed. It is EPA's understanding that some of the costs mentioned in DOE Reports on SGS technology were higher than might be expected as a result of firm fixed price contracts to process a specific amount of material which, at the time of actual operation, turned out to be a lesser amount of material to be processed. The subsequently calculated unit prices for this lesser amount of material was still based on the original firm fixed contract price, thereby resulting in higher unit costs than what was originally envisioned under the contract. During other trials of the SGS, the primary purpose was data collection, so that efficiencies of time and cost were not being optimized, again resulting in high unit cost.

Based on 12 deployments of the SGS, the mobilization/demobilization costs have ranged from $85,000 to $135,000. The cost of mobilization/demobilization for the SGS system was factored into the $55/cy unit cost for SGS. Special handling costs (e.g., oversize material) were not specifically addressed, however, EPA does not believe that there will be enough oversize material to significantly increase the true cost of separation.

v) On-site containment

Comment #75: The long-term effectiveness of an on-site containment cell is questionable.

Response #75: EPA agrees, and believes that excavation and disposal remedies are generally preferable to containment cells that require maintenance to ensure that site risks are managed properly.

Comment #76: Alternative LS-3 would be favorable in view of lower capital costs, and the fact that off-site disposal of non-radioactive soils is unnecessary and would not provide significant additional overall protection of human health and the environment, if the on-site containment was properly designed, constructed and operated, and the property used for non-residential purposes. The nine criteria would be satisfied.

Response #76: While the on-site containment of nonradioactive wastes may be the least costly, protective alternative evaluated, EPA felt that the cost savings were not significant enough, especially when present worth costs were calculated, to offset EPA's preference for excavating the waste to avoid incurring long-term maintenance costs. EPA also took into consideration the additional restrictions on land use that would be required should a large cell be placed on Parcel B, as well as the community's preference that the material be removed from the site.

Comment #77: For Alternatives LS-3 and CS-3, stabilization treatment and a RCRA disposal cell and cap were presumed necessary even though none of the RI samples failed TCLP. No technical basis for these protections was provided as opposed to other protective cover systems, e.g., parking lots, soil cover, etc. The risk reduction goals can be achieved (using on-site disposal) without treatment/RCRA disposal technology, and there are no specific regulations requiring treatment and RCRA-type on-site disposal.

Response #77: While none of the samples collected during the RI failed TCLP, there were several reasons why EPA developed an on-site treatment and containment alternative. Alternatives LS-3 and CS-3 satisfy the preference for remedies that employ treatment as a principal element (the FS did not include any other treatment alternatives) and are cost-effective. Although none of the RI samples failed TCLP, the number of samples collected was limited, and EPA cannot be assured that all of the material will pass TCLP without additional testing. The fact that there were some high concentrations of metals in the groundwater, albeit localized, indicates that the metals-contaminated materials can leach and be mobilized to an extent and therefore could continue to have an impact on the groundwater. Treatment of the metals-contaminated soils through on-site stabilization would minimize the continued leaching of these materials. While the stabilized materials would not necessarily need to be placed in a containment cell, given that the site is located above a sole source aquifer and the fact that the concerns about this aquifer are significant enough that the Long Island Landfill Law was enacted, EPA felt that the containment cell could provide an extra measure of protection for the groundwater.

Comment #78: It was suggested that EPA's rejection of on-site containment of radioactive wastes was based upon improper assumptions, and did not consider some important benefits of containment as elaborated below:

(a) The Long Island Landfill Law does not preclude on-site containment of materials at CERCLA sites and is not sufficient reason to reject on-site containment of radioactive materials. The Landfill Law was also not identified by EPA as an ARAR, and therefore should not be used to reject alternatives. Further, the Landfill Law doesn't apply to CERCLA remedial actions. The use of the site to contain the radioactive waste certainly does not represent the development of a new landfill, nor is it an expansion of an existing landfill. The rationale does not appear to be consistent with the fact that DEC just selected on-site containment of certain solid wastes as the remediation for Captain's Cove, nor with the fact that EPA developed a containment alternative in the FS to address the nonradioactive wastes. Even if the Landfill Law were applicable, it does not absolutely prohibit on-site containment, as the law contains several exemptions.

(b) The sole source aquifer designation for Long Island does not preclude on-site containment of wastes; it only precludes Federal financial assistance for projects which EPA determines may contaminate the aquifer. Incidentally, the sole source aquifer provisions are not identified as ARARs in either the Proposed Plan or the FFS.

(c) The explanations involving (containment) not being protective are without foundation. EPA has determined that on-site containment is protective at other Superfund sites, like Denver Radium, which is very similar to the Li Tungsten site in terms of contaminants, demographics, etc.

(d) Rejecting on-site containment of radioactive wastes without evaluation was improper because it ignores CERCLA's statutory mandate that EPA select cost-effective remedial measures and the CERCLA preference for remedies which employ on-site treatment; the PRP indicated that on-site stabilization and containment would satisfy these objectives.

Response #78: EPA understands the perspective that the Long Island Landfill Law might not be an ARAR for containment of radioactive wastes in a situation where the remedy relies exclusively on containment (i.e., capping in place only). However, practically speaking, given the areal extent of contamination, the hilly terrain on Parcels B and C, the presence of remaining structures and foundations, and redevelopment plans (and required infrastructure), EPA believes that a capping in place remedy could not be implemented without significant excavation and subsequent placement of contaminated materials occurring. It is clear that the placement of contaminated materials would trigger the Long Island Landfill Law's "prohibition" against landfilling activities. Therefore, the containment remedy cannot practically be implemented without violating the Long Island Landfill Law. Furthermore, EPA believes that other laws and regulations, most notably 10 CFR Part 40 and 6 NYCRR Part 380, specifically address the containment of radioactive waste and put forth criteria that would be difficult if not impossible to meet during a CERCLA cleanup of this site. As a point of clarification, DEC's selected remedy for Captain's Cove did not include containment. EPA's rationale for evaluating a containment option for the stabilized nonradioactive soils is provided in EPA's response to Comment #77.

EPA agrees with the comment that EPA's sole source aquifer designation does not preclude containment of wastes. However, in selecting remedies for Superfund sites, EPA does give significant consideration to remedies that provide long-term, permanent protection of sole source aquifers.

The primary reason why the concept of on-site containment of radioactive materials was rejected by EPA without being carried forward to the formulation and detailed analysis of alternatives stage is that EPA could not consider it truly protective in the long-term in a densely populated area like the City of Glen Cove. Finally, EPA feels that it simply would not have been implementable in the face of potential community and State opposition. EPA has received more than 700 petitions from citizens who are concerned about temporary fugitive radioactive dust emissions from this site. EPA believes this response would have been greatly magnified, had the first radioactive containment remedy in Region II been proposed for the site.

vi) Radionuclide Separation

Comment #79: What monitoring has been done vis-a-vis radioactive separation technology at other sites? Have there been studies on the short-term or long-term impacts of these cleanups?

Response #79: Various types of air monitoring have been conducted at sites where the Segmented Gate System (SGS) technology has been utilized depending upon location. Some of these sites (e.g., Middlesex, New Jersey and West Valley, New York) have been in or near residential areas where there were community concerns regarding air releases. None of the monitoring data indicated that a release above allowable concentrations had occurred beyond the site boundaries. At a Department of Energy (DOE) site in Texas, it was determined by the Texas Natural Resources Conservation Commission that the proposed SGS operation was exempt from permitting requirements because the anticipated emissions were far below the allowable concentrations at the site perimeter. One of the ARARs that EPA will meet during implementation of the selected remedy will be the National Emissions Standards for Hazardous Air Pollutants (NESHAP) regulation contained in 40 CFR Part 61, which limits exposures to the maximally-exposed member of the public to 10 mrem/year incremental dose.

Comment #80: Radiation separation effectiveness is uncertain until pilot testing can be performed during design. It is not mentioned whether a specific separation technology has been chosen. An unproven technology should not be relied upon to achieve cost savings, as it may wind up costing more than Alternatives LS-2 and CS-2 and not result in substantial separation. Therefore, its dubious cost savings outweigh the risks, flaws, and dangers that it poses. If there are problems with the separation of radioactive and nonradioactive fractions, the preferred remedy could be a higher cost than what is now estimated. Since the separation process will not be perfect, it could result in a higher level of contamination being left in the soil after remediation than if complete removal is accomplished under Alternatives LS-2 and CS-2.

Response #80: It is true that additional pilot or other testing of specific separation technologies would need to be performed during the remedial design, which is why EPA is not selecting a specific separation technology at this time. Treatability studies and/or pilot testing during the remedial design will provide the information necessary to determine if the technologies will be cost-effective. In the event that separation of radionuclide-contaminated soil from nonradionuclide soil contaminated with heavy metals cannot be accomplished in a cost-effective manner, the excavated soils will be disposed at appropriately licensed facilities as described in Alternatives LS-2 and CS-2 in the Decision Summary of this Record of Decision.

Comment #81: The percent of radiation Superfund sites is small, and only a few have gotten to the remediation phase. Therefore, EPA's experience is limited in this regard. In fact, Li Tungsten could be unique, vis-a-vis its powdery ore residuals. Therefore, EPA does not have the experience with soil separation to assure the community that the selection of a less costly alternative will pose no additional health risk.

Response #81: As indicated previously, EPA has extensive experience in the cleanup of sites contaminated with radiological materials. At the Glen Ridge and Montclair/West Orange Radium sites in Essex County, New Jersey, EPA has been cleaning up residential and public properties since 1991. Radiologically- contaminated soil originating from a nearby radium processing facility which operated in the early 1900's was used to bring low-lying areas in the residential communities up to grade. Several hundred homes were subsequently built on top of the contaminated soil. The contamination extends down to about fifteen feet below the ground surface in many locations. Removal of the contaminated soil requires that the houses be underpinned and subsequently restored to their original conditions. To date, more than 150,000 cubic yards of contaminated soil have been successfully removed from hundreds of properties at a cost of over $200 million.

Similar to the Glen Cove community, the residents of the densely-populated Essex County communities were very concerned about the contamination and cleanup project. EPA worked closely with local officials and affected residents to allay their fears. Health and safety plans and monitoring programs as well as transportation plans were developed with considerable input from the communities. Monitoring stations were established around the perimeter of the impacted areas to ensure that no contaminated materials migrated away from the site. All vehicles leaving the site were thoroughly decontaminated and scanned, again to ensure that the vehicles would not carry contaminated dirt onto local roads. The trucks carrying contaminated soil away were securely covered and checked with scanning monitors so that fugitive dust would not impact residential areas. These and other measures have enabled EPA to implement the cleanup project without incident.

It is important to note that most ore processing involves the grinding down of the ore to increase the surface area, thereby maximizing extraction efficiency. The finer ore materials at such sites, however, are typically found "blended" with soils and other waste materials which typically contain moisture in the percentage range and therefore do not exhibit the properties associated with fine powders. The procedures and controls utilized to ensure the safe implementation of separation technologies would be the same as those described above for excavation and materials handling. Also, please see EPA's response to Comment #79.

Lastly, EPA will undertake testing of various separation techniques during design. The Agency will not implement a separation technology such as SGS unless the testing indicates it will be effective. In the event that separation of radionuclide-contaminated soil from nonradionuclide soil contaminated with heavy metals cannot be accomplished in a cost-effective manner, the excavated soils will be disposed at appropriately licensed facilities as described in Alternatives LS-2 and CS-2 in the Decision Summary of this Record of Decision.

Comment #82: The SGS will prolong the presence of the radioactive material in residential locations. Therefore, Alternatives LS-2 and CS-2 should be selected, since it's the most expedited method of eliminating the risk to the public.

Response #82: EPA estimates that Alternatives LS-4 and CS-4 will take 8 months longer to implement than Alternatives LS-2 and CS-2. The risks from excavation and materials handling will be mitigated by health and safety considerations as discussed in EPA's response to Comment 2.

Comment #83: There is not a sufficiently demonstrated technical basis to conclude that the SGS will achieve the separation efficiency assumed in the FFS, given the low cleanup criteria. The FFS assumed that 55% reduction in the volume of soils can be achieved. This is not supported by the technical literature.

Response #83: The ability of the SGS technology to detect radium or thorium contamination at 5 pCi/g has been demonstrated and documented at the New Brunswick, New Jersey cleanup project in 1996 where over 4,800 cubic yards of similar wastes and contamination were reduced in volume by 55%. Follow-up verification sampling documented that the cleanup levels were achieved. Again, EPA plans to evaluate SGS and other separation methods during design. In the event that separation of radionuclide-contaminated soil from nonradionuclide soil contaminated with heavy metals cannot be accomplished in a cost-effective manner, the excavated soils will be disposed at appropriately licensed facilities as described in Alternatives LS-2 and CS-2 in the Decision Summary of this Record of Decision.

Comment #84: Published reports indicate that the SGS is prone to unscheduled pauses and mechanical challenges, and that the system tends to be operational during only 50% of planned operating schedules.

Response #84: The published reports documented the material handling challenges that were unique at each site and how these challenges were overcome. Some demonstrations were conducted under extreme conditions for the purpose of determining how to overcome the failures. During the Fall of 1998, software and mechanical upgrades were made which reduced and almost eliminated pauses due to gate failures. Delays due to material handling are expected but minimized by past experience when they occur. For example, if a site has a lot of grass or sod, the grass is mowed extremely short or killed prior to excavation. The grass is processed along with the soil. If the grass root ball is not reduced, it will clog the screen deck and cause delays.

The SGS was deployed to Los Alamos National Laboratory in March 1999 to remediate over 2,500 cubic yards and recorded an average daily operational time of 6.48 hours out of a 10-hour day and an average volume processed volume of 170 cubic yards/day. As noted above, EPA intends to evaluate SGS and other separation methods during design.

Comment #85: The SGS cannot process oversize or wet material. Neither limitation was factored into EPA's costs or schedule for implementing the remedy.

Response #85: The SGS processes material that can pass through a 1.5-inch screen deck. It is true that the SGS does not process material that is rejected from the screen unless it is crushed and/or shredded. Based on previous experience, however, very little contamination will be present in the oversize material. Oversize material can easily be scanned with a hand-held detector or sampled. Depending on the volume of oversize, it may be less expensive to consider it above criteria and dispose of it off-site.

The SGS can process clay soils with moisture contents up to 16 percent by weight and sandy soils with moisture contents up to 25 percent by weight. The majority of soils that will be processed lie above the water table and consists mainly of sandy soils. All soil to be processed by the SGS is first stockpiled allowing any excess moisture to evaporate or drain from the pile.

D. Remedy Implementation Issues

Comment #86: It was also requested that the required monitoring include an Environmental Radiation Ambient Monitoring System (ERAMS) to be operated by the EPA Office of Radiation and Indoor Air (ORIA) to monitor radioactive pollutants on the site, around the site, and at numerous monitoring stations around Glen Cove. The EPA should provide radioactive accident assessment capability to protect the Glen Cove population from radioactive fallout.

Response #86: As noted above, the details of the air monitoring program will be developed during the RD as part of the HASP. At that time, EPA will give consideration to the suggestion that monitoring include ERAMS; EPA Region II can also seek support from ORIA in developing or reviewing any monitoring program that is implemented.

Comment #87: Community involvement during the design phase should take place to ensure that all possible safeguards are specified and implemented, particularly with regard to dust containment structures, decontamination procedures, air monitoring, etc.

Response #87: EPA agrees that continuation of its community involvement, particularly with organizations like the Li Tungsten Task Force, is important to keep the public apprised of the progress being made at this site, and to continue to solicit community input on those issues which have been demonstrated as being of community interest/concern.

Comment #88: What procedures will EPA incorporate into its cleanup plan to prevent trucks and other vehicles from tracking radioactive dirt throughout Glen Cove?

Response #88: Prior to leaving the site, all trucks that are transporting waste or which have entered a hazardous zone will be required to move through a decontamination zone, where trucks will be inspected and screened for contamination; truck tires will be washed to ensure that soil is not tracked off the site. The radioactive material will be placed in specialized containers prior to being placed on trucks for transport. The non-radioactive metals-contaminated soils will likely be loaded directly onto trucks fitted with tarps. These and other procedures/restrictions to ensure that truck or other traffic/equipment do not track contaminated soil beyond the site boundaries will be outlined in the remedial design documents. As indicated previously, EPA has extensive experience relative to the trucking of radiological and other waste materials.

Comment #89: Will additional intrusive work be done to better define the extent of excavation required?

Response #89: Yes, it is anticipated that additional characterization will be needed to completely delineate contaminated areas at both properties. This is commonly done at the start of the design phase of the remedy, i.e., pre-design sampling. This sampling program will be developed as part of the initial workplans prepared for the remedial design.

Comment #90: Bulk excavation of materials during the Phase I remediation will inevitably lead to mixing of radiologically and non-radiologically contaminated soils and residues. Mixing of the excavated soils increases the overall volume of material which must then be processed through the SGS unit for volume reduction. The cost for this processing is apparently not accounted for in any of the cost estimates. In addition, Phase I activities will add other costs not presently accounted for vis-a-vis maintenance of stockpiled materials, site security, and double handling after the removal activities.

Response #90: Phase I activities will address approximately 6,000 cy of soil on Parcels A, lower B, and lower C. Due to the contaminant profiles and surficial depth of the material to be excavated during Phase I, their associated volumes, the likely soil composition, etc., it is anticipated that the majority of these soils will be contaminated with heavy metals, but not be radioactive. EPA does not anticipate using sophisticated separation technology during Phase I operations. In certain areas like on lower Parcel C, precision excavation strategy will probably be all that is needed to effect a reasonable separation. Heavy metals-contaminated soils will be directly disposed of off-site as part of Phase I. Any remaining wastes that require disposal as radioactive materials will be placed in the Dickson Warehouse for disposal during Phase II cleanup. EPA does not anticipate that the costs associated with not disposing of the residual radiological waste during Phase I will be particularly significant.

E. General Enforcement Issues

Comment #91: Who is responsible for the cleanup?

Response #91: Under the Federal Superfund law, several categories of parties may be held responsible for the cleanup, including the current owners and operators of the site, parties that owned or operated the site at the time of disposal of hazardous substances, and parties that arranged for the treatment or disposal of hazardous substances that came to be disposed of at the site. EPA generally attempts to identify as many of these parties as possible. At those sites where no viable potentially responsible parties can be found, EPA is authorized to use Superfund money to remediate the risks posed by the site. At this site, however, viable PRPs have been identified.

Comment #92: How many potentially responsible parties are there, and what are their names?

Response #92: EPA has to date identified 33 entities as PRPs at the Li Tungsten site. Among these entities are owners and operators of the site, as well as transporters and generators of the waste that came to be disposed of there. EPA continues to investigate entities that have some involvement with the site, and anticipates identifying other PRPs. The PRPs identified to date are as follows:

Advanced Metallurgy, Inc./AMI Doduco, Inc.
Alloy Carbide Company, Cerametals Division
American National Carbide Company
Carbidie, Inc.
Chi Mei Corporation
City of Glen Cove, New York
Contacts, Metals and Welding, Inc./CMW, Inc.
County of Nassau, New York
Cyprus Amax Minerals Company
Duramet Corporation/Cerametal Group
Electrical Contacts, Ltd.
Ex-Cell-O Machine Tool/Textron Inc.
Fansteel, Inc.
    VR/Wesson Company, subsidiary of Fansteel, Inc.
    Hydro Carbide Corporation, subsidiary of Fansteel, Inc.
General Carbide Corporation
General Electric Company/GE Lighting
General Services Administration
Glen Cove Development Company
Hughes Christensen Company
Kennametal Inc.
Kulite Tungsten Corporation
John C. Li

Li Tungsten Corporation
Minmetals, Inc.
Multi Metals Division, Vermont American Corporation
Philips Elmet Corporation/Philips Electronics North America
Sandvik Inc.
Teledyne, Inc./Allegheny Teledyne Inc.
U.S. Department of Commerce
U.S. Department of the Treasury
W.R. Grace & Co.
Wah Chang Smelting and Refining Company of America, Inc.

Comment #93: What is the City's financial liability as a PRP for Captain's Cove? When will a figure be assessed?

Response #93: The Superfund statute is premised on the liability for cleanup costs being "joint and several." In other words, each responsible party at a Superfund site could be sued individually for the full cost of cleaning up a site. Nonetheless, based on the history of the site, EPA believes that the City of Glen Cove's liability is limited to the costs associated with the Captain's Cove portion of the Li Tungsten site. As such, EPA would only consider the City of Glen Cove to be liable on a joint and several basis for the cost of remediating the Captain's Cove portion of the Li Tungsten site.

It is customary for a group of PRPs at a site to seek to allocate the liability for cleanup costs among themselves based on each PRP's relative share of liability. EPA is prepared to offer alternative dispute resolution resources to the City and other potentially responsible parties who choose to work together on such an allocation of the Li Tungsten site costs. Nonetheless, a final figure for the City's liability may not be known for some time, since it depends on such factors as the City's allocated share of the ultimate cost to complete the cleanup several years hence.

Comment #94: Has EPA begun to "go after" the PRPs?

Response #94: EPA has sought information about the relationship of hundreds of parties to the site, and has sent notices of potential liability to 33 PRPs, which informs them of their status as PRPs. EPA has also held several informal meetings with PRPS in an effort to acquaint them with site activities, as well as to discuss their potential liability.

Comment #95: Does the cost or actual details of remedy implementation depend on the PRPs signing on and agreeing to do the work or providing funding?

Response #95: The ROD includes EPA's estimate of the costs for remedy implementation. However, many PRP groups claim they can get work done at less cost than the government. The elements of the remedy is outlined in the ROD would remain the same, i.e., the type of technology, the material targeted for treatment and the level to which contaminated materials are treated. Obviously, if PRPs agree to perform the work, some implementation details would change. For example, the PRPs would have their own design and construction contractors. In this case, the PRPs would have to demonstrate that the contractors are qualified to perform the work, and EPA would oversee their work.

Comment #96: Is EPA still in the process of identifying PRPs?

Response #96: Yes, EPA is still assessing the information it has regarding other parties in addition to those that were named above. Some of these parties may receive notice in the near future that they are PRPs at the Li Tungsten site.

Comment #97: Will EPA seek to recoup the $10,000,000 in Superfund money already spent at the Li Tungsten site?

Response #97: Yes, EPA will first seek to recover its costs through an RD/RA settlement. Should negotiations fail to produce a settlement, EPA may seek to recover this money through a lawsuit brought pursuant to the cost recovery provisions of the Superfund statute.

Comment #98: Dividing the site into two operable units is proper. Further, companies who did not send tungsten or radionuclide-related materials to Li Tungsten should not be compelled to contribute to the investigation or remediation of the Captain's Cove property. Likewise, PRPs who did not own, operate, or control disposition of byproducts or wastes produced by Li Tungsten and removed to Captain's Cove shouldn't be saddled with cleanup costs of Captain's Cove.

Response #98: Issues regarding the nature of material sent to the Li Tungsten site for processing and the hazardous substances produced by such processing speak to the divisibility of harm among the PRPs and the allocation of their liability. As such, these issues are more appropriate for an allocation process in which the PRPs may choose to engage.

EPA has identified a number of PRPs for the site to date based on information that leads EPA to believe that such parties generated, either directly or through their business arrangements with the Li Tungsten Corporation or its predecessors, hazardous substances that came to be disposed of at both areas of the site. EPA believes that a number of these parties sent tungsten and other material whose processing produced hazardous substances (other than radionuclides) that were disposed of at the site. It is not possible at this time, and may never be possible, to ascertain the specific time frame during which the hazardous substances disposed of at the Captain's Cove were generated. Therefore, EPA considers parties identified as generator PRPs at the site to be jointly and severally liable for the full site costs.

Comment #99: For those who may be compelled to fund or implement remedial action at Superfund sites, cost minimization is an important goal.

Response #99: EPA recognizes the importance of cost-effective cleanups, whether actions are to be implemented by PRPs or utilizing the Superfund. The fact that cost is one of the nine criteria for evaluating remedial alternatives reflects the importance that EPA gives to this criterion. EPA's selection of Alternatives LS-4 and CS-4 which includes measures to reduce the volume of radioactive material, and thereby disposal costs, reflects an effort to try to reduce costs while ensuring remedies are protective of human health and the environment and comply with ARARs.

F. General Site Issues

Comment #100: How much of the estimated $29,000,000 cost to clean up the Li Tungsten site will be provided by EPA?

Response #100: EPA follows an "enforcement first" policy, that is, EPA first seeks to have those parties that are responsible for the contamination (PRPs) perform or pay for the cleanup before utilizing the Superfund. One of the key reasons that EPA has adopted this policy is that there is not sufficient money in the Superfund to pay for cleanup of all sites; EPA attempts to preserve the fund for those sites which do not have viable PRPs. At this site, however, EPA is attempting to secure Federal Superfund money to perform Phase I of the site cleanup, which involves remediation of the soil contamination on Parcel A and the lower portions of Parcels B and C, as an expedited step in the cleanup process. EPA's preliminary cost estimate for this work is $1.5 million. EPA Region II believes that the Phase I cleanup represents a unique opportunity to clean up a large portion of a Superfund site at a fraction of the total remedial costs, and subsequently get the cleaned property back into viable use; therefore, EPA Region II is trying to secure funding to achieve the Phase I cleanup, which would not be subject to the usual policy of first exhausting the enforcement possibilities.

Funding for the remainder of the site cleanup (Phase II) could be borne by the PRPs, subject to their willingness to sign a consent a consent decree, comply with an administrative order for the work, or to fund EPA's performance of the work. If fund money is eventually needed, its availability would be subject to prioritization by EPA Headquarters depending on the risks posed by the site in comparison to other sites across the country; the greater the site risk, the higher the priority.

Comment #101: What is the project schedule, including enforcement steps?

Response #101: Concerning the Phase I cleanup referenced in the preceding response, EPA hopes to secure funding and begin Phase I of the cleanup early in the year 2000. EPA estimates that Phase I cleanup may be completed as early as mid-2000, assuming that there is no delay due to the dredging of Glen Cove Creek (which is discussed in subsequent comments). Within about one month of the issuance of the ROD, EPA expects to begin negotiations with the PRPs for the Phase II work. EPA estimates that this work may be completed by 2002.

Comment #102: What is the current rating of the site on the National Priorities List? Has the Li Tungsten site been successful in getting funded in the past?

Response #102: Sites on the National Priorities List do not have numerical ratings which determine their priority for funding by the EPA. At Li Tungsten, funds to perform the RI/FS and removal activities have been readily available. At the present time, however, funding for remedial actions, that is, the actual work needed to carry out the remedy prescribed in RODs, is subject to prioritization by a panel of representatives from EPA Headquarters, and the Regions based on the risks posed by the site. This placement of a site on the prioritization list only occurs, however, if no other source of funding is available, i.e., the PRPs are unwilling to conduct the remedial work themselves and are unwilling to provide funding for EPA to conduct the work. The position of the site on the prioritization list determines the timing of the funding.

Therefore, if the remedy is not performed by potentially responsible parties, evaluation and comparison of this site's relative human health risks to other national Superfund sites that require remedial action funding would determine its position on the prioritization list.

Comment #103: Could the data that were used to make the decisions be made available in time to be reviewed and commented on before the comment period deadline?

Response #103: Since the beginning of the comment period (July 28, 1999), the data used to develop the Proposed Plan and ROD have been available in the repositories for this site, located at the Glen Cove Public Library, and EPA-Region II offices at 290 Broadway in New York City. The data are contained in the RI report for Operable Unit 1, the FFS for Operable Unit 2 and the FS for both operable units.

Comment #104: Who are being supplied by the industrial wells mentioned in the Proposed Plan?

Response #104: At the present time, the one and only industrial well at the Li Tungsten facility is not operational. During the time when the facility was operational, this well was used for process water as well as for fire suppression.

Comment #105: Cost or the EPA's fiscal year should not be an issue as to when or how these decisions are made. The issue of concern should be the health and safety of the nearby workers and residents as well as the wildlife and their natural habitat.

Response #105: Cost-effectiveness is a balancing criterion for the evaluation of remedial alternatives, and EPA is obliged to consider cost-effectiveness when comparing alternatives that have already met the two threshold criteria of protectiveness of human health and the environment, and ARARs. EPA's fiscal year is only a consideration for planning purposes; it does not impact how decisions are made.

Comment #106: Why wasn't the map showing active and inactive wells on or near the sites included in the Proposed Plan?

Response #106: The referenced map indicated active and inactive municipal water supply wells in the City of Glen Cove. The Proposed Plan is a summary document and only a limited number of tables and figures are typically included such as a site map and cleanup level and cost tables. The ROD, on the other hand, contains all relevant tables and figures. EPA's RI Report for the Li Tungsten site, which is available in the public library as part of the Administrative Record for this site, has a copy of the aforementioned map in Vol. II, Figure 3-6.

Comment #107: Why weren't the environmental problems associated with the Li Tungsten facility known at the time of the facility's closing? Doesn't EPA inspect or keep track of these things?

Response #107: Local and State environmental agencies are generally familiar with and aware of facilities or properties within their jurisdiction with environmental problems. These agencies may seek assistance in addressing these properties at the Federal level as was the case with the Li Tungsten facility which closed in 1985. EPA was made aware of the potential for environmental concerns at the closed facility in 1989. EPA's first action at the Li Tungsten facility was taken in 1989 when it ordered the property owner to remove any acutely hazardous materials from the facility. The more work that EPA did at the site, the more apparent it became how complex the contamination problems were. These problems were characterized as a result of a two-year comprehensive RI, involving analyses of hundreds of samples from different media. It would be impossible to have characterized the extent of contamination simply from site inspections.

Comment #108: Why hasn't the environmental problem at the Li Tungsten facility been cleaned up by now? When is it going to be cleaned up?

Response #108: Significant cleanup has been completed through two removal actions at the Li Tungsten facility (one implemented by EPA and one implemented by the owner under EPA supervision) which have resulted in the removal of many of the radiological, chemical and structural dangers posed by this property. The final stages of cleanup will follow EPA's issuance of this Record of Decision, and will include remedial design and remedial action activities. EPA estimates that cleanup activities at the site could be completed by the year 2002.

Comment #109: How will the proposed dredging of Glen Cove Creek affect the EPA's efforts to remove waste from the sediment drying area? It does not seem as though EPA was aware of the long time frame associated with the dredging/interim storage at Li Tungsten since it is not mentioned in the Proposed Plan.

Response #109: Although EPA was aware that the City and the U.S. Army Corps of Engineers were intending to dredge the creek in the near future, at the time that the Proposed Plan was issued EPA was not fully aware of the Army Corps's specific schedule for the creek dredging or the specific time frame required for sediment drying. At the time, EPA did not believe that there would be a significant conflict in the timing of the sediment-drying activities and the EPA Phase I activities. The creek dredging and sediment drying activities could present some implementation issues which could complicate or delay the performance of Phase I activities. The intent of expediting the cleanup of the southern half of the facility property (Phase I) is to return part of a Superfund site to the community for purposes of re-use. In this case re-use will be determined, within the constraints of the provisions of this ROD, by the Glen Cove Industrial Development Agency, the prospective purchaser of this property. If the IDA feels that the dredging and sediment drying activities should occur as soon as possible, then EPA's fast tracking of Phase I activities may be delayed. Should EPA's Phase I activities not be able to be performed concurrently with the sediment drying, then Phase I activities may be limited to lower Parcels B and C, with the Parcel A cleanup performed after the sediment drying work is completed, or performed as part of the Phase II remediation.

Comment #110: The City, EPA, DEC, and U.S. Army Corps of Engineers must coordinate their efforts so that EPA's time estimates for remediation may be revised in light of whatever the final decisions on dredging might be.

Response #110: EPA agrees with the comment. EPA and DEC will coordinate scheduling, as well as proper management techniques concerning the sediment storage/drying (e.g. control of run-off, fugitive dust, water discharges, etc.) with the Army of Corps of Engineers and the City.

Comment #111: The TAG advisor commented that even though some problems existed with EPA's commissioned lab work by O'Brien and Gere regarding the analyses for Po-210 and Pb-210 in the soil/fill material at Captain's Cove, the effort still provided useful information. The TAG advisor noted that "the elevated levels of Po-210 appear to be present only in conjunction with other more easily detectable radioisotopes. Thus, cleanup of the radionuclides of concern will also remove these radionuclides as well. Therefore, no further sampling is needed for site characterization."

Response #111: Comment noted.

Comment #112: The Phase I Remediation activities are not technically justified and should not be implemented. These activities will also increase site risk, because of the storage of radioactive materials. Exposure to gamma radiation is largely controlled at the present time by the overall areal distribution of the radiological contaminants, as well as their subsurface location. Excavation will result in higher exposure levels.

Response #112: The remedial actions that would take place during Phase I, except for the temporary storage of a relatively small volume of radionuclide-contaminated material in the Dickson Warehouse, are part of the selected remedy, and would merely be fast-tracked to allow for re-use of the lower portion of the Li Tungsten facility first. EPA does not believe that the temporary storage of these materials in the Dickson Warehouse is a significant contributor to any increase in site risk.

Comment #113: The Phase I remediation was not an element of the Proposed Plan. No documentation has been developed regarding the technical elements of the proposed Phase I activities that can be subjected to technical review by the PRP group. Additionally, no public comment period was provided for these activities.

Response #113: While the Phase I remediation was not cited in the Proposed Plan, the data and information which relate to this effort are contained in the RI and FS reports. Also, the Phase I activities were presented at the August 16, 1999 public meeting and were also discussed in an August 19, 1999 meeting between EPA and some of the PRPs for the site. The materials to be addressed under Phase I represent a relatively small fraction of the volume of waste that will be excavated at the site.

Although the timing of the Phase I work may be impacted due to the Army Corps of Engineers dredging of Glen Cove Creek, EPA has proposed to fund this work to allow redevelopment of the Li Tungsten site in substantial conformance with the City of Glen Cove Revitalization Plan, which is the "centerpiece" for EPA's Showcase Community designation of Glen Cove. The accelerated placement of these properties back into a commercially viable scenario would also meet the primary objective of EPA's "Recycling Superfund Sites" initiative.

Comment #114: There is insufficient information to link the radioactivity at the Captain's Cove property to the Li Tungsten site. Lack of knowledge about the constituents of other industrial wastes emplaced at the site and of the content of potential sources of NORM (such as dredged material) leaves open the question of the origin of some or all of the radioactivity at the Captain's Cove property. While the cumulative effect from other radionuclide-bearing waste materials disposed of at Captain's Cove would obviously not account for the localized high concentrations found in subsurface samples in Areas A and G, it could account for the majority of measurements at or slightly above the 5 pCi/g level.

Response #114: There is a significant amount of information regarding the constituents of other wastes that have been placed at the Captain's Cove property over the years. The City of Glen Cove, pursuant to an order with the NYSDEC, recently conducted an RI/FS at this property under State Superfund law. The RI Report, prepared in 1998, describes the findings of that investigation. There is also much anecdotal evidence of how ore residuals were disposed of in two locations on the Captain's Cove property during the years when the facility was operational. The ore residuals in the two disposal areas are chemically and visibly similar to the ore materials at Li Tungsten. At the time when EPA was considering linking Captain's Cove to the Li Tungsten site, radioisotopic analyses of the Captain's Cove and Li Tungsten materials were evaluated by EPA and were found to exhibit characteristics substantially similar so that, together with the anecdotal evidence of dumping from the Li Tungsten facility, the linkage between the two properties was made. Analytical data obtained during the RI confirms this linkage.